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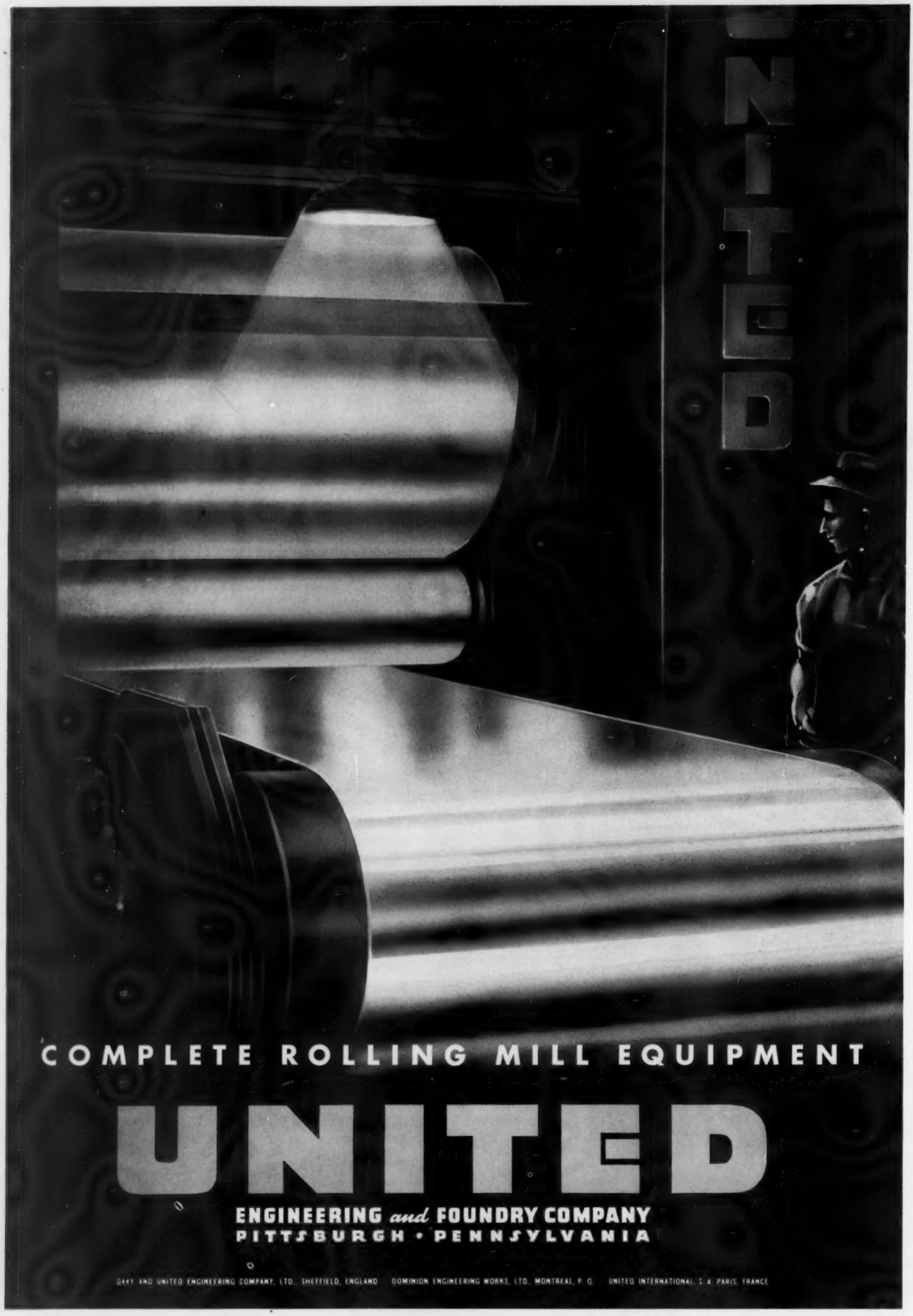
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STEEL
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As the Editor Views the News

■ FINISHED STEEL markets have a slightly better tone. Steelmaking advanced 2.5 points (p. 23) to 48 per cent last week, first increase in 12 weeks. While this reversal of the recent downward trend results largely from heavy backlogs of sheets and strip booked at price concessions, the rise in some districts (p. 67) is attributed partly to a general improvement in business. A stronger scrap market accompanies better operations. New base prices on certain products remain to be tested; meanwhile, warehouses have reduced quotations on principal items. . . . Automobile companies continue preparations for new models but generally are maintaining production of current models. However, output last week (p. 30) fell sharply to the lowest level for the year to date, the result of a body plant strike which tied up assemblies of Chrysler Corp.

• • •

Hits Price Slashing

Idleness of private capital is at the root of the nation's business problems and results chiefly from dizzy finance and unsound economic policies of the national administration (p. 18), according to Tom M. Girdler, chairman, Republic Steel Corp., and retiring president, American Iron and Steel institute. Speaking before the forty-eighth general meeting of the institute, Mr. Girdler placed a share of the blame for poor steel earnings on failure of the industry to match prices with soaring costs. "The fault lies not with buyers. They do not honestly object to fair prices. It lies entirely with the steel industry itself," he said. . . . Ernest T. Weir, chairman, National Steel Corp. (p. 15) was named to succeed Mr. Girdler as president of the institute.

• • •

Machinery Makes Jobs

Continuous sheet mills have not reduced employment, Bennett Chapple, assistant to the president, American Rolling Mill Co., told the National Association of Purchasing Agents (p. 27) at its annual convention. "There are 1.57 jobs today per ton of production, compared with 1.34 in the handmill days," he stated. . . Industry is recognizing the Clayton and Sherman acts as defense weapons against strikes, as evidenced by a $7,500,000 damage suit (p. 23) filed by Republic Steel Corp. against the CIO. . . . Large orders for military aircraft (p. 27) were placed last week by the army air corps. Additional awards are expected after start of the new fiscal year July 1.

• • •

Heavy Work Now Ground

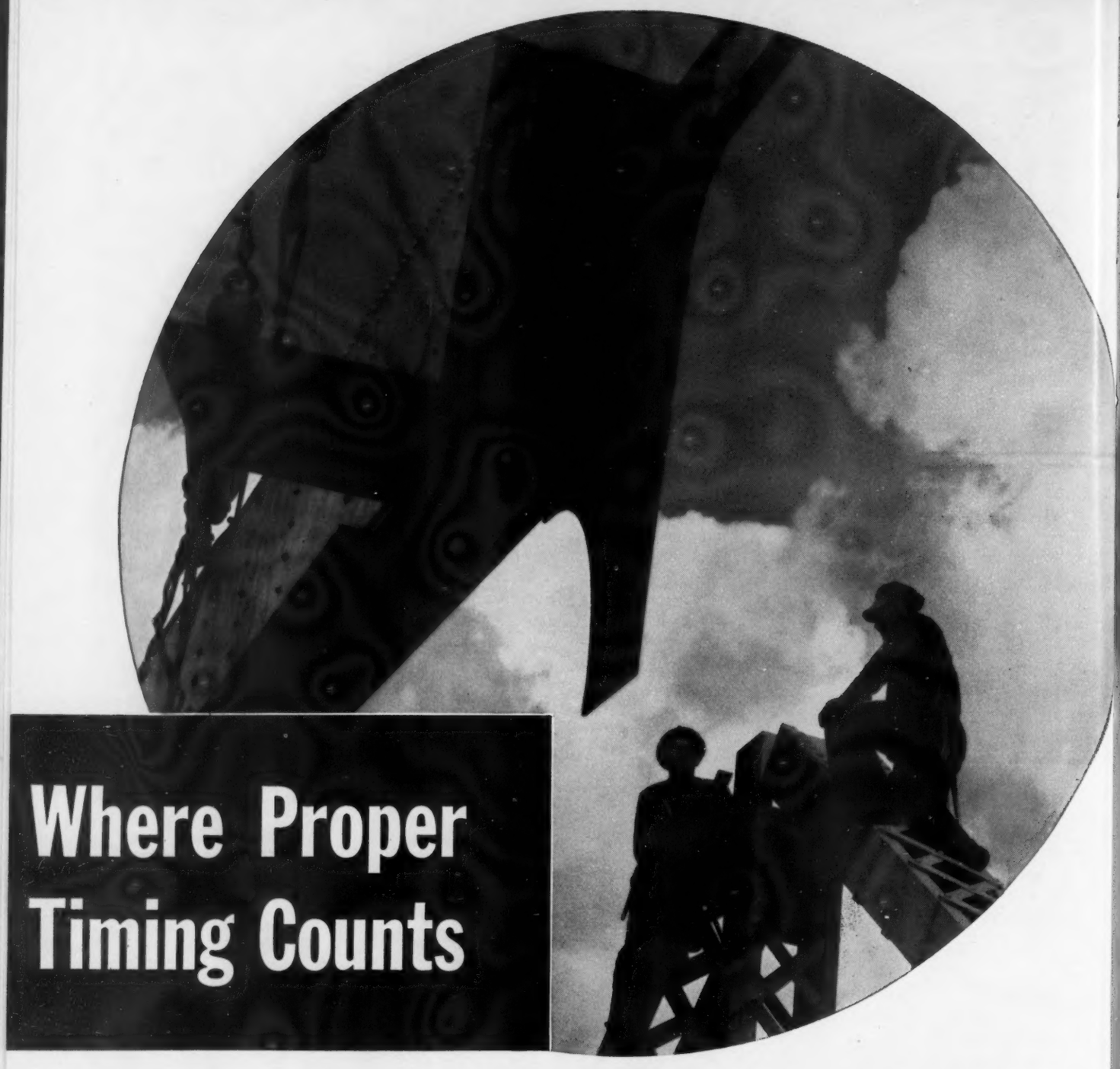
Surface grinding has definitely arrived as a recognized method of heavy machining (p. 40), chiefly because tool builders have had imagination and courage to break with traditions which had previously bound the process. Contributing factors are improved types of abrasive wheels, and grinding machines incorporating superior design features. . . . Anticipating a continuously expanding use for cemented carbides, the country's largest producer has completed a new manufacturing plant in Detroit (p. 42) which consolidates present facilities in three cities and has a capacity ten times present demand. Production control is an outstanding feature. . . . A new type of light-weight ingot mold insulation, consisting of granulated cork encased in clay and thrown on the ingot top after pouring (p. 46) reduces piping and permits repouring. Carbon pick-up is eliminated.

• • •

Welding in Pipe Lines

With development of standards for welding fittings, pipe lines now can be laid out with definite assurance that the finished job will meet specifications and that welding can be performed speedily and reliably (p. 48). . . . Materials handling equipment, including live and gravity roller conveyors, elevators and lowering devices, is aiding oil refiners (p. 50) in their operations of cleaning, repainting and refilling returned drums. . . . Careful selection of steel and close control of heat treatment must be exercised in manufacture of oil well pumps and sucker rods (p. 54). A nickel-molybdenum type of steel shows good service results. . . . Automobile engineers, opening their World congress in New York (p. 64), see progress in the next decade far outstripping that of the past decade.

E C Kreutzberg



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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Steel Institute Studies Further Product Standardization, Other Problems

■ WARNING that the steel industry faces a "vital necessity for profits" was sounded by T. M. Girdler, retiring president, before the forty-eighth general meeting of the American Iron and Steel institute, Waldorf-Astoria hotel, New York, last Thursday. Mr. Girdler, chairman of Republic Steel Corp., Cleveland, told members what he thought was wrong with the steel business in particular and the nation's business in general.

Mincing no words in his attack on New Deal policies, which he regarded primarily responsible for present difficulties, he was equally forthright in censuring producers for pricing policies which he said are contributing to the industry's poor financial showing. For abstract of Mr. Girdler's address, see page 18.

This year's sessions attracted more members than ever before. Attendance slightly exceeded the record of approximately 1000 made last year. The figure, however, is not comparable with the 2000-total in attendance at the 1937 session, last before the regulation restricting attendance to members only went into effect.

E. T. Weir, chairman, National Steel Corp., was elected president to succeed Mr. Girdler, who had served two years. Benjamin F. Fairless, president, United States Steel Corp., and Frank Purnell, president, Youngstown Sheet & Tube Co., were named vice presidents, succeeding William A. Irvin, former vice chairman of the United States Steel Corp., and Mr. Weir.

H. L. Hughes, vice president, United States Steel Corp., was re-elected treasurer, and Walter S. Tower, executive secretary.

Sen. Millard E. Tydings, Maryland, speaking at the annual dinner, criticized the "whole reckless program" of the federal administration.

Advances Recovery Program

Particularly he castigated the spending policy, the tax policy, the experimentation and the lack of sympathy with business' problems.

"Obviously the policies of the present administration cannot go on interminably. Indeed, to pursue the course much further is to hasten disaster.

"How then can we turn the flank of this movement, so shot with sophistry? That is a task of those who are in positions of leadership, in and outside of government, a task of getting 120,000,000 men, women and children back on the road to real recovery."

Senator Tydings suggested a partial program to restore confidence and to create new employment for the idle in private business.

His recommendations: First, reorganize the federal government to accomplish not only efficiency but real and general economy. For example, he said many millions can be saved in all departments by dropping press agents, propaganda and other activities which are costly and more political than anything else.

Second, eliminate more than a score of borrowing corporations and agencies and let the treasury borrow as needed for all the federal government.

Third, have a thoroughly honest purge of the welfare rolls, base relief on real need, require localities to bear a definite portion of the burden that local interest may demand elimination of abuses.

Fourth, enact a tax program that raises sufficient revenue to at least approximate the staggering appropriations and recurring deficits of today. This can be done by broadening the income tax base requiring each citizen to carry part of the national tax burden, according to his ability to pay.

Fifth, overhaul the Wagner labor act.

Sixth, revise the social security

◆

Congratulations!

■ American Iron and Steel institute's new president, Ernest T. Weir, chairman of National Steel Corp. (left), and Tom M. Girdler, chairman of Republic Steel Corp. (right), who retires after two terms. A clerk at 16, Mr. Weir has spent 47 years in the industry, built National from a small tin plate mill into the country's fifth largest steel producer. His company has shown a profit and paid dividends for 37 consecutive quarters since its organization in November, 1929

act. Eliminate the intended accumulation of reserve. Place it on more of a pay-as-you-go basis.

Seventh, remove expenditure of public funds from one-man domination, where too often political considerations rather than the public welfare dictate where and how it shall be spent—as was the case in building of bridges in Maryland during the last campaign.

Following Senator Tydings' address, Chairman Girdler called on Charles M. Schwab, chairman, Bethlehem Steel Corp. Mr. Schwab gave brief reminiscences of his long career in the steel industry, expressed his faith in the industry's future.

Scheduled speakers at the general session, in addition to Mr. Girdler, were Mr. Fairless and Arthur Roeder, chairman, Colorado Fuel & Iron Corp. Due to illness Mr. Roeder was unable to appear and his paper was read by Mr. Tower.

Further standardization of steel products will be found beneficial, declared Mr. Fairless. In the field of flat-rolled products, particularly, he said, there is room for additional efforts toward simplification.

Standardization Limited

Standardization, he declared, is desirable only insofar as it provides against unnecessary and unprofitable diversification of products, but at the same time allows for useful variety.

"Diversification tends to diminish the tonnage involved in any one item scheduled for production. Needless diversification and the small order walk hand in hand.

"The steel producer is not at all unappreciative of small orders, particularly when conditions are such that they may be combined and consolidated for execution at the mill. A hundred relatively small orders involving only a few standard products need not present a serious problem as to melting, rolling, or processing, but as variety increases, the expense of production mounts rapidly.

"To roll five tons of a certain selected shape costs $8.80 more per ton than to roll a hundred tons. In another case the increase amounts to $12.95, and a third instance to more than $15 per ton.

"The figures applying to one ton, as against one hundred, or fifty, or even five tons, are almost startling, although not entirely unexpected, for the differentials in rolling costs alone often exceed the selling prices. When expense of supplying steel of a special composition is added to the excess in rolling costs, the results are still more unfavorable.

Mr. Fairless cited examples of standardization of steel products and the benefits that have resulted. "It is probably safe to say 90 per cent of the structural steel and plate now produced is manufactured under not more than ten different specifications, and further that approximately 75 per cent of the structural steel is produced under two specifications."

Similar standardization of sheet piling, rails and other products has lowered costs and resulted in increased use.

In a business as widespread as the steel industry, he continued, it is inevitable that the normal and necessary diversity of products will be large. New products will be developed to provide for new requirements.

B. F. Fairless

"With this situation before us it seems appropriate to suggest that the steel industry take stock of what it is producing at the present time and attempt to determine, with the aid of its customers, whether unnecessary items are distracting attention. If a superfluity of grades is found to exist, along with whimsical variations in products, a good housecleaning is in order."

Mr. Fairless referred to the work currently being done by the institute's technical committee. He suggested this committee, or one sponsored by the institute, might take the initial steps toward the ends indicated.

"The ideas and attitude of industry must first be crystallized. A considerable amount of co-operative technical spade work must be done on the home grounds and those of numerous customers. Thereafter the contacts with various trade associations, technical societies, and standardizing bodies such as the American Society for Testing Materials and the American Standard association could be made for the treatment of those features which are of interest to them.

"Thus the program would receive the broad consideration which is desirable, for it is known that standardization is increasingly effective as it is decreasingly arbitrary. The steel industry, fully aware of its responsibilities to the public, its customers, and its stockholders, is in position to move toward a further rationalization of its technical measures and problems of cost, all in the interest of the common good."

Key to successful labor relations and public relations, said Mr. Roeder, is to set up a "chain of goodwill that will communicate itself throughout the organization and to the public." Basis for achieving this end must be the genuine respect, confidence, loyalty and sympathy between management and employes and alignment of company interests with those of the public.

"Mention labor relations to the man in the street. Ten to one he will first think of wages. After this, not necessarily in this order, will follow pension plans, group insurance, unemployment benefits, safety and medical care.

Need Employes' Confidence

He might even think of organized recreation, company stores, house organs, educational facilities, club and social activities, or other more indirect provisions that many companies make for the comfort, security and contentment of their employes and their dependents.

"All of these are important. Some are indispensable, but are they the real basis for sound industrial relations? I think not.

"Something far more fundamental must lie back of our program. Industrial relations are basically human relations. Their soundness must, therefore, depend upon man-to-man attitudes. Management can have the respect, confidence, loyalty and sympathy of employes—yes. And the basis of achieving them must be the genuine respect, confidence, loyalty and sympathy of management for the employes.

"Such a basis is not easy to achieve. It must extend throughout the entire organization. . . .

"Every leader in the group must understand that it is futile for any man to say, 'I am the boss.' But when one worker turns to another and says, 'There goes the boss,' that means something. And when he turns and says, 'There goes that old blankety blank,' that means something too—something quite different. If such a spirit is in the plant, it means that much of the cost of an extensive program of material employe benefits is being wasted.

"One factor in relationships with employes all too often overlooked is the part played by the foreman. His contacts with workers are not sec-

ondhand and academic, but direct and intimate. To the men he represents the company. For all practical purposes he is the 'boss.'

"Public relations, like the labor program, is made up of human relationships. The chief difference is that one deals with the employes and the other with the outside world. Here again the whole program depends on mutual faith and trust. Any inconsistencies in the relations between the company and the public are brought about by the deviation of the corporate policy from the public interest. For sound public relations depend upon the alignment of company interests with those of the public."

Management, continued Mr. Roeder, must have the ability to maintain harmony within the organization, and obtain the goodwill of the outside world toward it. The executive "must be the man who can make all cogs fit together"—a leader, a co-ordinator, an activator. Many cogs are required to make a complete unit of modern management. Each member of the executive staff and supervisory force has his job to do and his responsibilities to carry.

"Good management cannot be provided solely by the thin layer of a few top executives. It depends on intelligent, effective performance all along the line.

"One of the distinguishing marks of good management is its insistence upon upholding at one and the same time the rights of all.

"This will mean eternal regard for the welfare of the workers, the distributors, the stockholders, and the consumers."

Review Welding Advantages

Charles M. White, vice president, Republic Steel Corp., presided at the afternoon technical session.

Advantages and limitations of welded construction were enumerated by Isaac Harter, vice president, Babcock & Wilcox Tube Co., New York, and J. C. Hodge and G. J. Schoessow, Babcock & Wilcox Co., Barberton, O., in their paper "Value of Electric Arc Welding in Design and Its Limitations."

Needed most, the authors pointed out, are: Further study of unit shapes and in particular of their junctions for structural uses, if the low stress gradients made possible by welding are to be utilized to greatest advantage; steels of higher quality; exact knowledge of steel weldability with respect to composition; work to establish for each composition the limiting preheat temperature to eliminate cracking difficulties; influence of factors which determine when stress relieving is necessary or when local stress relieving is permissible; and how to make welds more simultaneously to minimize distortion.

With solutions of these problems, advances in welding were predicted as follows: "(1) Much higher welding speeds; (2) marked reduction in the volume of weld metal required in a joint, with a resultant minimizing of distortion and extent of the stress-affected area; (3) more general use of preheating and controlled cooling, permitting use of higher strength steels; and (4) further development of steels possessing the optimum composition for strength and ready weldability."

Problems in the manufacture and use of steel products were discussed by James E. Lose, vice president, Carnegie-Illinois Steel Corp.

"Proper development of the steel industry rests on the successful solution of the problems with which it is confronted in the manufacture and subsequent use of its products," said Mr. Lose. "Therefore our customers' needs and requirements become our problems."

Mass production methods by customers has brought a demand for steels conforming to rigid specifications in chemistry, size and other physical characteristics. This limits the possibilities for mass production technique in the manufacture of steel.

Mr. Lose discussed problems in making and using individual steel products—tin plate, sheet and strip, bars and semifinished, railroad rails, wheels, axles and cars, wire, structurals and plates, and pipe and tubing.

Urges Extensive Program

To improve the situation, he suggested: (1) To advocate to the consuming trade the advantage of better size rolling; (2) to continue a properly co-ordinated research program both along fundamental and technological lines; (3) to promote frank discussion of problems between producers and users; (4) to carry on diligent research in the development of new uses for steel; and (5) to promote the present work of standardizing carbon steels by grades.

How Great Britain's steel industry was reconstructed after price-cutting brought it to the brink of insolvency in 1932, was related by James Henderson, deputy-chairman, Appleby-Frodingham Steel Co. Ltd., London, in discussing the manufacture and use of steel in that country.

Introduction of wide strip mills, Mr. Henderson said, is widening the markets of British steelmakers. One mill is already in operation, another being built. He declared resistance welding is increasing the use of steel in general construction and building work.

Bradley Stoughton, dean of engineering, Lehigh university, Bethlehem, Pa., described "The Training of a Metallurgist." A college's chief function in such training, he said, is to accomplish five major objects: (1) To impart fundamental information; (2) to train the facilities of observation concerning pertinent phenomena; (3) to instill the spirit of inquiry concerning the reasons for such phenomena; (4) to inculcate and discipline orderly and logical habits of thinking; (5) to cultivate facility in expression in both oral and written discourse, so that the products of thought may be effectively communicated.

J. T. Whiting

Mr. Whiting, president of Alan Wood Steel Co., Conshohocken, Pa., was awarded the Steel institute's medal for 1938, in recognition of his paper "Microscopic and Petrographic Studies of Blast Furnace Material," delivered at the forty-seventh general meeting.

Following graduation from the University of Michigan in June, 1909, he joined the metallurgical department of Illinois Steel Co.'s South works, South Chicago, Ill., going from there to the blast furnace department. He worked successively for the By-Product Coke Corp., South Chicago, then under the management of Semet-Solvay Co.; Federal Furnace Co., South Chicago; Whitaker-Glessner Co., Portsmouth, O.; Steel & Tube Co. of America, Mayville, Wis.; and Donner Steel Co., Buffalo.

In September, 1927, he joined the Hamilton Coke & Iron Co., Hamilton, O., as vice president and general manager. In January, 1932, he was elected vice president of the Alan Wood Steel Co., and in February this year he was appointed president of the company, succeeding Clement B. Wood, who resigned as president but continued as chairman of the board.

Warns Steel Industry Must Reform Pricing Policies To Improve Earnings

By T. M. GIRDLER

■ IN CONSIDERING the problems confronting our industry it is important to remember that the state of steel is inseparable from the state of the nation.

The country at large has never really recovered from the collapse of 1929. After ten years the problem of restoring genuine prosperity and finding jobs for the unemployed remains acute and pressing. That is still true despite all of the strange and fantastic nostrums that have been applied to the country's economy, and despite the squandering of billions upon billions of dollars in the effort to "spend our way out of the depression."

Fortunately, the country is rapidly waking up to the fact that the real root of our trouble lies in the idleness of private capital, as represented by the large accumulated savings of millions of people. It is now generally recognized that something is blocking the flow of these savings into the normal channels of enterprise, and that unless the obstacles are removed there can be no genuine uplift of business or of employment.

No Dark Mystery

Recently the reasons for the blockade have been the subject of public inquiry. There is no dark mystery about the facts, and if a realistic answer is wanted by the inquiring body, it is right at hand and in plain view. It is to be found chiefly in the dizzy finance and the unsound economic policies of the present national administration, which have destroyed confidence, created widespread uncertainties and made long-term planning impossible. To all this there has been added over recent months a distracted state of mind which has been called "war hysteria," created out of news dispatches from Europe. During its height this war hysteria was permitted to divert the attention of the public and the government from the pressing problems at home, but these problems are too urgent to be kept out of sight for long, and they are again to the fore, crying for sober consideration and solution.

Some months ago the country was filled with talk of a changed front in Washington. The administration was to start a great program of business co-operation—all aimed at restoring confidence, stimulating industry and trade, and increasing employment. Well, we are still waiting for it to start. According to all reports there was a battle royal among the inner circle of the palace guard, with the extreme leftwingers routing the moderates, and the co-operation program was cancelled.

And now, according to all reports, another kind of program is being devised for industry by these same leftwingers. Having tied the victim hand and foot, knocked him to the ground and thrown a heavy weight on his chest, they accuse him of "sulking" because he is not up and around as usual. It seems they are planning to prescribe a new assortment of stimulants, all taken out of the same old bottle labelled "deficit spending." Apparently they are laboring under the hallucination that the expenditure of a few more billions will accomplish what the spending of 20 billion dollars had failed to do. (They are like some of the people in the steel industry, who never learn anything by experience.)

Not long ago a distinguished United States senator described the present government in Washington as "the most wasteful and autocratic bureaucracy ever inflicted on this or any other country."

That is a strong and sweeping statement, but unfortunately not lacking in elements of truth. We see supporting proof of it in the fact that the federal debt in the last six years has swollen to more than $40,000,000,000, and that current annual expenditures are at the rate of nearly $10,000,000,000, or almost $4,000,000,000 in excess of income.

A considerable portion of these vast sums has been spent ostensibly to "prime the pump" of business. But the pump is still dry. It is asserted by responsible persons that fully 10,000,000 people remain unemployed and 21,000,000 individuals continue as government dependents.

Notwithstanding the ostensible purposes of the deficit spending there is ample justification for the suspicion that a hidden purpose is to bring about a redistribution of wealth. What is happening is a wider distribution of poverty. . . .

In 1938 the (steel) industry paid nearly $100,000,000 in taxes, which was approximately $15,000,000 more than the industry earned before taxes. Of the total, nearly 80 per cent went to local tax collectors.

Taxes Handicap Industry

When you examine last year's tax bill for the industry you find it was only 4 per cent less than that for 1929, although production was some 50 per cent less, and the earnings before taxes were 80 per cent less. The tax total was equivalent to $254 for each wage earner attached to the industry and equal to more than $5 for each ton of finished steel produced.

While the amount of the tax total is bad, the nature of some of the federal levies as a handicap upon industry is even worse. I refer to such tax monstrosities as the capital stock tax, the undistributed profits tax and similar levies. Many of these taxes were imposed upon the country in the furtherance of un-American theories, to use the tax power, not for revenues but for coercive purposes. They have accomplished no good or useful purpose. They have helped to create and perpetuate unemployment.

Of all the monkey wrenches which

Abstract of address at the forty-eighth general meeting of the American Iron and Steel institute, New York, May 25. Mr. Girdler retired as president of the institute.

have been thrown into the industrial machine the most harmful is the so-called Wagner act. The major contributions of that law and its administration by a biased board have been industrial confusion and demoralization.

That act, as it now stands, is wholly one-sided and unfair. Promoted by its advocates as guaranteeing collective bargaining rights of employes, its result has been to advance the selfish interests of certain labor organizations. The welfare and the wishes of employes themselves have been secondary considerations in the law's administration.

The steel industry's position on the Wagner act has frequently been misrepresented as being based on opposition to collective bargaining. As all of you know, that is untrue. Sound national policy unquestionably requires a labor law. But it must be equitable in its provisions and in its administration, to all classes and all groups. For my own part I would welcome such a law for it would serve a constructive purpose and contribute to the public interest.

Must Remove Obstacles

I have enumerated but a few of the policies and measures of government which are obstructing the return of prosperity. Unless these obstacles are removed or modified there is no basis for confidence in the future, no prospect even that our system of private enterprise can survive.

But I believe many of these objectionable policies will be changed. I believe it because the pendulum of public support unmistakably is swinging away from them.

I have commented briefly upon these national and international affairs because they are the broadly controlling factors in the outlook of the steel industry. But in the midst of all these difficulties, industry still is faced with its daily task.

I believe that the industry has a good record with respect to its obligations to labor. I also believe its responsibilities to the consuming public have been discharged with equal credit.

But it has failed its stockholders. In 1938 it paid to the tax collector an amount double that disbursed to its more than half-million stockholders. Since 1909 the steel sales dollar going to the stockholder in dividends has declined from 8 cents to 2½ cents.

If we go back again to 1909 for comparison we find that stockholders then received 40 cents in dividends for each dollar in wages. In 1938 they received only 11 cents. Average annual earnings of the industry since 1930 have been only 1.2 per cent on invested capital.

Judging from the record the industry has become allergic to profits. To look at its performance you would think it had anticipated those who want the profit system abolished, and for all practical purposes had established itself as the first great industry devoted to the idea of production for use.

Not all of the blame for poor earnings in the steel industry can be put on the New Deal or the international situation. Part of it rests squarely upon the industry itself. If we do some honest soul-searching we will find that a share of this trouble lies in our own policies and practices. True enough, in recent years demand has been restricted, volumes have been unsatisfactory and the industry has suffered from the general condition of uncertainty and confusion, but none of these nor all of them combined justify prices for steel below the cost of production, or insufficient to yield a fair profit.

The industry has seen its costs mount higher and higher and grow ever more rigid. It has seen the break-even point soar like a rocket to around 50 per cent of capacity, the highest in history. It has seen the attempt by government to make wage rates fixed and inflexible. And what has the industry done to meet these situations? It has brought down prices.

When prices are lowered in keeping with economies of production and to stimulate consumption, that is one thing. The result is of wholesome benefit to the national economy. But when prices are lowered in the face of high costs without stimulating the general use of steel, that is another thing. The result is a step backward for a great industry and a blow to the national economy. As we well know, the major portion of orders received by the steel industry is accompanied by specifications for special requirements, making it impossible for steel ever to become a mass production industry in the same sense as other industries turning out millions of units of a single kind or style of product.

I believe in the lowest possible price for steel consistent with quality and costs. Any industry as basic as steel would be in an utterly indefensible position if prices for its products were exorbitant and its profits excessive.

I regard as equally indefensible the industry's failure to earn a fair profit upon a fair volume of business.

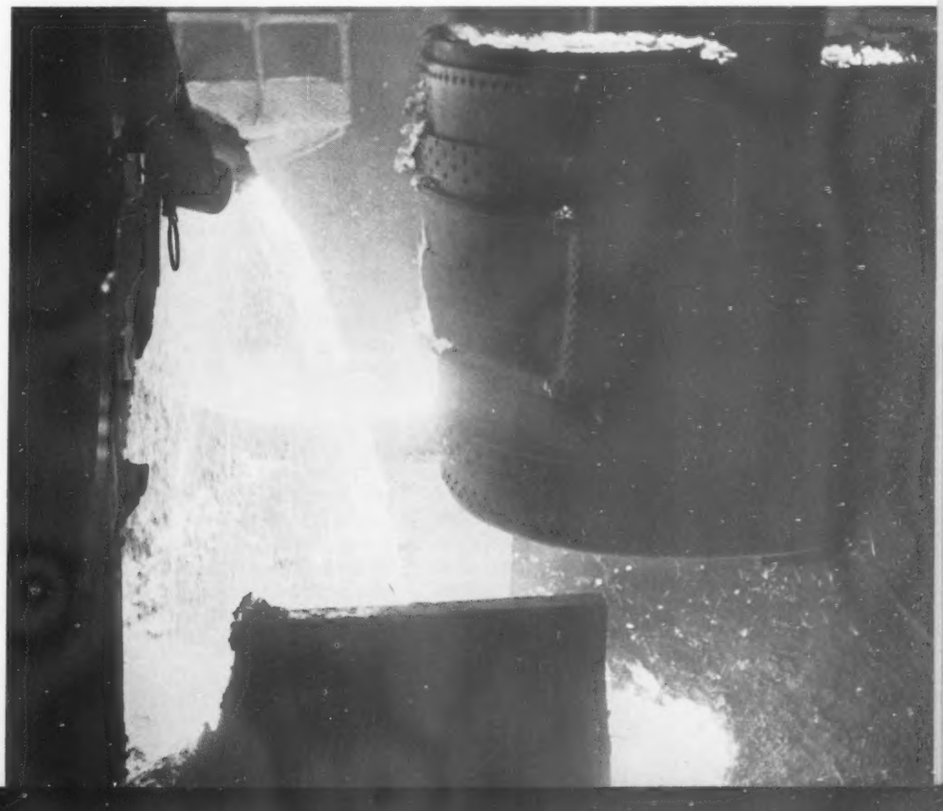
Have Forgotten Stockholders

Steel should increase, and has increased at great cost, the efficiency of its methods and the quality of its products.

Consumers have shared in these benefits and greatly expanded markets have resulted. That is exactly as it should be, but in the scramble for business in the hard years of the recent past, the industry has completely forgotten the existence of the stockholder—the owner of the business, whose savings gave it the breath of life. The industry has sold steel at cost or less than cost and actually passed on some costs of doing business to stockholders.

The fault lies not with buyers. They do not honestly object to fair

(*Please turn to Page* 64)



Metal Trades Group Told New Deal Policies Block "Greatest Prosperity"

■ HOPES for future industrial and national prosperity hinge largely on changes in government administration, it was indicated by addresses made before some 500 metalworking executives and industrial relations experts in Chicago last week. Occasion was the forty-first annual convention of National Metal Trades association at the Palmer House, May 24-25.

George H. Houston, New York, in an address on "Future Demand for Capital Goods in the United States," forecast that in the '40's America would enjoy the greatest prosperity and the greatest demand for capital goods it has ever known—if certain adverse political factors can be corrected.

Julius P. Heil, governor of Wisconsin, speaking at the banquet, May 24, as a fellow industrialist, digressed from his topic of "Partners—Men and Management" long enough to say he had told Wisconsin voters prior to his election: "I am an industrialist. Industrialists are of the greatest benefit to labor and to the farmer today." If more confidence were placed in industrialists, he said, there would now be less men on WPA projects, fewer shovels resting on the street corners of the country.

At one point in his extemporaneous remarks he scored the present administration, stating bluntly that the President, with the assembled brain-power and talent of Washington behind him, should be able to devise a simple formula to balance the nation's budget.

He concluded with the plea, "Don't sit by and let John do it! Rehabilitate America by the route of industry!"

Pays Tribute to Metalworkers

Another high point of the banquet program was an address by Col. Roscoe Turner, nationally-known speed flier. Colonel Turner won applause with the statement he admired Governor Heil for the political upset he had scored in Wisconsin, and stated his hope there were sufficient men left in the country to achieve certain other political upsets.

The flier also paid tribute to the metalworking industry as a chief contributor to the progress made in aviation. In his own case, he said, metallurgical progress had been chiefly responsible for doubling the horsepower of his racing engines without increasing weight. His address, "Speed in Aviation", cited examples of castings being cracked under the strain of six-mile-per-minute speeds. This was corrected by advanced metallurgical practices.

The two-day convention opened with a discussion on "Use and Application of Job Rating." A. W. Kress presented specific cases in which management had used job rating to a definite advantage. E. L. Berry, assistant general manager, Link-Belt Co., Chicago, and Howard Goodman, vice president, Goodman Mfg. Co., Chicago, spoke on the uses and benefits of job rating in their own plants.

Report of the association's committee on merit and employe rating was presented by W. W. Finlay, Wright Aeronautical Corp., Paterson, N. J.; and the use of employe rating was discussed by O. D. Reich, Dexter Folder Co., Pearl River, N. Y., committee's chairman.

Anti-Union "Swing" Cited

"One of the noteworthy trends in recent months has been the 'conservative swing' of public opinion toward stiffer state labor legislation," stated Nelson W. Pickering, association president, in his report. "The increased demand for amendment of the Wagner act is also a favorable indication. This trend, it seems to me, can best be explained as a perfectly normal and sensible reaction to the public's impatience with sit-down strikes, 'wildcat' union organizing activities, and the policies and practices adopted by the labor board.

"The large majority of employes has never been interested in unions. The continual bitter wrangling between the CIO and AFL unions, as well as some of the independents, and the coercive practices adopted so generally by unions toward non-union workers, has been responsible for a growing loss of enthusiasm for organized labor, even by those employes who had been led to believe that unionization was the one and only means of protecting their own interests.

"Labor leaders," Mr. Pickering continued, "are recognizing this 'back-swing' movement and are, therefore, trying to consolidate their position. Politics and the 1940 election seem to be playing a considerable part in the 'sit-tight' attitude which the American Federation of Labor has adopted, and there appears to be no possibility at present of a united labor front being formed by the two major labor organizations."

He stated emphatically, "I do not believe that it is necessary to recount here what American industry, free of clumsy and vindictive interference by government or organized force, has done for this nation. A survey of changing conditions in the standard of living from 1800 to 1939, and comparison of American industrial progress with that of Europe is sufficient to demonstrate what has been accomplished.

"Without a doubt, management control has been essential to this achievement. Yet such control is not self-perpetuating. It is like liberty, something to understand clearly, to guard carefully, and to avoid subtle encroachment upon. It will continue to exist to the advantage of all groups only if it has the active cooperative support of those who believe in its benefits. For 40 years the National Metal Trades association has been an important instrument in its preservation in the metal trades industry," Mr. Pickering concluded.

Those attending the luncheon, May 24, were entertained and enlightened by the demonstrations and discussion of Dr. Thomas Phillips, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., on "Adventures in Electricity." He presented methods by which air could be completely rid of dust particles, illustrated the destruction of bacteria with light rays, and produced million-volt currents, which, as he demonstrated to the audience's amusement, actually made his hair stand on end.

William McCulloch, foreign news editor, *The Spectator*, Hamilton, Ont., contributed absorbing accounts of international affairs.

Middle-Class Squeezed

"We cannot hope to maintain political freedom unless men who want to work can look forward to economic independence," declared Samuel B. Pettingill, former congressman from Indiana. "A fact of the greatest importance being overlooked is that the thrifty American is being liquidated. The middle-class citizen is in the squeeze. It is constantly more difficult for him to provide for his dependents and for his own old age."

John C. Metcalfe, former chief investigator, Dies committee, told the convention: "It is sheer folly to argue which of the three—communism, naziism or fascism—is worst. All are anti-American, despite the fact each moves under a pretense of patriotism.

"As long as the American people stand by the principles of the bill of

rights, none of these alienisms will ever succeed," he said. "For you cannot have democracy and dictatorship in one and the same place."

In an address, "Stand on Your Rights and Go Ahead," David R. Clarke, counsel for the association, discussed legislation which has affected industrial relations in the past 20 years.

Interest of association members in employe hospitalization was disclosed by Dr. Otto P. Geier, Cincinnati Milling Machine Co., Cincinnati. His reports were based on questionnaires sent to a majority of companies represented at convention.

A picture of current events in Washington was presented by John W. O'Leary, chairman, executive committee, United States Chamber of Commerce, Washington.

All association officers were reelected, including President N. W. Pickering, president, Farrel-Birmingham Co. Inc., Ansonia, Conn.; First vice president A. H. Timmerman, vice president, Wagner Electric Corp., St. Louis; and Second vice president Roe S. Clark, vice president, Package Machinery Co., Springfield, Mass.

Gearmakers' 100 Per Cent Line Is 1928, Not 1938

■ In the report of the twenty-third annual meeting of the American Gear Manufacturers' association, May 15-17, appearing on page 27 of the May 22 issue of STEEL, announcement was made in the second paragraph of a new statistical service being launched by the association. It was stated that "one of the preliminary charts was on view, the '100 per cent line'—being that for the year 1938, which was a typical 'good year' in the gear business." Reference to the "year 1938" was a typographical error; it should have read "year 1928."

Blast Furnace and Coke Oven Group Meets June 2

■ Eastern States Blast Furnace and Coke Oven association will conduct its annual spring meeting and golf tournament at Pittsburgh Field club, Aspinwall, Pa., June 2.

Program calls for separate meetings of the blast furnace and coke oven groups in the morning; a luncheon; golf in the afternoon; and a dinner at which business will be conducted and new officers elected. F. D. Schreiber, assistant general superintendent, Pittsburgh Coke & Iron Co., Neville Island, Pittsburgh, will address the coke oven session on "Some Ideas on the Recovery of By-products"; the blast furnace session will feature a roundtable discussion.

■ Orders for steel boilers in April were 834, compared with 660 in March and 385 in April last year, the bureau of the census reports. Orders for four months totaled 3650.

Steel's the Thing in This School

■ **Almost entirely steel are library furnishings at Ellsworth high school, Ellsworth, Pa. It comprises chairs, desks, tables and bookshelves. Said to be one of the country's most completely steel-equipped schools, Ellsworth also uses the metal for classroom and drawing desks, assembly hall chairs, domestic science cabinets and tables, workbenches and equipment in chemistry and biology rooms. Photo, Bethlehem Steel Co.**

Activities of Steel Users, Makers

■ KEYSTONE Steel & Wire Co., Peoria, Ill., has acquired controlling interest in National Lock Co., Rockford, Ill., manufacturer of furniture, refrigerator, cabinet and stove trim hardware and screws and bolts. National Lock has assets of about $5,000,000 and current annual sales volume is about $4,000,000. Purchase was by undisclosed cash settlement of litigation in federal and Illinois courts. Keystone has furnished a substantial portion of steel used by National.

♦

Standard Tube Co., Detroit, has appointed the Union Hardware & Metal Co., Los Angeles, as southern California distributor of its welded steel tubular products.

♦

Trundle Engineering Co., Cleveland, has opened an eastern office in the Graybar building, New York, with Hamilton B. Bole, formerly president, Barst, Forster, Dixfield Co., New York, in charge.

♦

General sales offices of Tolhurst Centrifugal division, American Machine & Metals Inc., 100 Sixth avenue, New York, will be transferred June 1 to East Moline, Ill., where the company's manufacturing plants are located.

♦

Pidgeon-Thomas Iron Co., Memphis, Tenn., has been appointed distributor for the entire line of coated welding electrodes and gas welding wires manufactured by Page Steel & Wire division of American Chain & Cable Co. Inc., Monessen, Pa.

♦

Baldwin-Duckworth Chain Corp., Springfield, Mass., has established a warehouse and sales and engineering offices at 276 Canal street, New York. K. B. Brandenburg, who has been transferred from the Detroit office, will be in charge. F. T. Lange will assume charge of Detroit operations and office at 2-165 General Motors building, replacing Mr. Brandenburg.

♦

Blaw-Knox Co., Pittsburgh, has received an order from Heyl & Patterson Inc., for six all-welded hoisting drums to be used in hammer head cranes for a United States navy yard. Each drum is to be 10 feet in diameter and 18 feet long, 2½-inch plate. Contract covers fabrication of drums and machining of a large gear for each drum, each gear measuring 14 feet six inches outside diameter.

April Exports in Slight Decline

■ STEEL and iron exports in April, excluding scrap, totaled 153,884 gross tons, compared with 162,098 tons in March, a loss of 8214 tons, according to the metals and minerals division, department of commerce. Total exports in April were 394,008 tons, compared with 474,360 tons in March, a decline of 80,352 tons, or 17 per cent. This loss was almost entirely in scrap, which was 72,138 tons less than the preceding month.

Other items showing smaller shipments included steel bars, which fell from 12,702 tons in March to 7569 tons in April, nonalloy plates from 27,942 tons to 23,252 tons and black sheets from 27,805 tons to 21,568 tons.

For five months this year exports, excluding scrap, were 585,487 tons, compared with 801,089 tons. With scrap included exports for this period were 1,590,730 tons, compared with 2,063,016 tons in the same months last year, a decline of 23 per cent, scrap exports being 256,744 tons smaller.

The smaller total in April probably is largely accounted for by the shorter month.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	April 1939	March 1939	Jan. thru April
Pig iron	1,599	1,059	13,507
Ferromanganese and spiegeleisen	7	18	34
Other ferroalloys	50	68	243
Ingots, blooms, etc.:			
Not containing alloy	4,620	5,709	33,835
Alloy, incl. stainless	1,614	408	6,338
Steel bars, cold fin.	447	498	2,777
Bars, iron	72	58	245
Bars, concrete	2,970	2,181	9,000
Other steel bars:			
Not containing alloy	7,569	12,702	34,231
Stainless steel	51	117	183
Alloy, not stainless	752	993	4,241
Wire rods	1,791	2,654	5,158
Boiler plate	422	171	2,275
Other plates, not fab.:			
Not containing alloy	23,252	27,942	81,269
Stainless steel	5	8	22
Alloy, not stainless	83	70	261
Skelp, iron or steel	824	714	2,917
Sheets, galv. iron	834	385	1,983
Sheets, galv. steel	8,759	7,202	28,720
Sheets, "black" steel:			
Not containing alloy	21,568	27,805	93,527
Stainless steel	92	76	261
Alloy, not stainless	195	290	863
Sheets, black iron	377	616	2,146
Strip steel, cold-rolled:			
Not containing alloy	1,446	1,436	7,071
Stainless steel	67	21	189
Alloy, not stainless	52	23	117
Strip steel, hot-rolled:			
Not containing alloy	2,712	2,608	16,165
Stainless steel	46	.....	146
Alloy, not stainless	4	2	10
Tin plate, taggers' tin	16,740	16,735	57,113
Terne plate	556	232	1,167
Tanks, except lined	2,081	2,881	6,778
Shapes, not fabricated	7,219	6,522	24,748
Shapes, fabricated	3,180	3,422	10,200
Plates, fabricated	281	315	896
Metal lath	78	102	344
Frames and sashes	99	91	336
Sheet piling	727	140	1,580
Rails, 60 lbs.	6,559	3,465	16,617
Rails, under 60 lbs.	226	123	531
Rails, relaying	.....	686	1,840
Rail fastenings	561	732	2,767
Switches, frogs, crsgs.	320	302	863
Railroad spikes	253	212	1,248
R. R. bolts, nuts, etc.	187	213	596
Boiler tubes, seamless	604	651	2,079
Boiler tubes, welded	96	5	112
Pipe:			
Smls. casing, oil-line	5,930	5,129	19,142
Do. welded	448	274	1,076
Seamless black	590	452	2,198
Pipe fittings:			
Mall. iron screwed	323	270	1,150
Cast iron screwed	228	175	633
Pipe and fittings for:			
Cast iron pressure	3,689	1,274	8,187
Cast iron soil	594	546	2,438
Pipe, welded:			
Black steel	1,602	1,280	5,344
Black wrought iron	137	424	1,200
Galvanized steel	1,934	2,368	7,369
Galv. wrought iron	196	160	941
*All other pipe, fittings	336	302	1,172
Wire:			
Plain iron or steel	1,888	3,154	8,409
Galvanized	1,840	1,773	8,208
Barbed	3,626	3,404	11,346
Woven-wire fencing	240	364	1,009
Woven-wire screen cloth:			
Insect	37	39	139
Other	127	128	478
Wire rope and cable	511	288	1,420
Wire strand	79	127	348
Electric welding rods	153	147	450
Card clothing	9	5	23
Other wire	629	577	2,226
Wire nails	1,486	1,497	5,687
Horseshoe nails	53	87	259
Tacks	26	21	82
Other nails, staples	254	351	1,166
Bolts, machine screws	722	774	2,631
Castings:			
Gray iron (incl. semi steel)	459	309	1,246
Malleable iron	71	118	441
Steel, not alloy	56	57	339
Alloy, incl. stainless	54	116	448
Car wh'ls, tires, axles:			
† Wheels and tires	1,095	1,094	3,635
† Axles, no wheels	923	743	2,298
† Axles, with wheels	32	587	1,253
Horseshoes and calks	83	6	120
Forgings, n. e. s.:			
Not containing alloy	1,165	666	2,846
Alloy, incl. stainless	212	349	641
Total	153,884	162,098	585,547
Scrap, iron and steel	237,691	310,223	996,052
Scrap, tin plate	762	866	3,290
Tin plate circles, strips, cobbles, etc	636	437	2,401
Waste-waste tin plate	1,035	736	3,440
Total scrap	240,124	312,262	1,005,183
GRAND TOTAL	394,008	474,360	1,590,730
Iron ore	312	65,890	67,525

*New class. Includes flanged malleable cast iron fittings, expansion joints, and riveted pipe and fittings.
†New class.

Seasonal Variations Are More Pronounced

■ Seasonal variations in ingot production have become marked in recent years, particularly in period 1929-1937 when consumer goods industries gained much ground at expense of heavy industries, according to the American Iron and Steel institute. There also has been a change in the months in which high or low output prevails, the year's peak now coming generally in the spring rather than autumn.

Among principal causes for greater spread between high and low months in this period are the greater capacity of both the steel industry and its consumers, as related to demand and the continued rise in demand for consumer goods.

Labor Receives Larger Share of Steel Dollar

■ Labor's share of steel dollar rose to 41½ cents last year, an increase of nearly 10 per cent over 1937, and 14 per cent over 1929, according to the American Iron and Steel institute.

Steel taxes took 5½ cents, almost 40 per cent more than in 1929, but about the same as in 1937 when industry's total tax bill reached highest point in history. Sharp reduction in taxes paid last year as a result of year's unprofitable operations was largely offset by increase in social security tax rates.

Shares last year going to stockholders and to industry's surplus were reduced to the vanishing point. About 7 cents of each dollar was charged off for depreciation and depletion. Charges on bonds amounted to 2 cents per dollar of gross sales, against 1 cent in 1937 and 1½ cents in 1929.

Cargo Vessels Launched In "Twin" Ceremony

■ Two cargo vessels, the S. S. CHALLENGE and the S. S. RED JACKET, first of six which Federal Shipbuilding & Dry Dock Co., United States Steel Corp. subsidiary, is building for the United States maritime commission, were launched May 20 at Kearney, N. Y.

New ships have registry of about 7400 tons and are 450 feet long. Names were adopted from early American clipper ships.

Inland To Rebuild Blast Furnace Plant

■ Arthur G. McKee & Co., Cleveland, have been awarded contract to rebuild Inland Steel Co.'s No. 1 blast furnace plant at Indiana Harbor, Ind. The plant was built by the McKee company in 1907 and produced the first pig iron made in Indiana.

A new and larger blast furnace will be built on the site with new ore bins and handling equipment, gas cleaning plant, and hot blast stoves. Work will be completed by about Jan. 1.

■ Monthly examination of sales sheets by representatives of Western Bar Iron association and Amalgamated Association of Iron, Steel and Tin Workers developed a card of 2.20 on boiling, bar and 12-inch mills and 2.30 on guide and 10-inch, for May. This compares with 2.25 and 2.35, which had been in effect since July, 1938.

Republic Sues CIO for Damages

■ SUIT to recover $7,500,000 damages from the CIO, SWOC, John L. Lewis, Philip Murray and nearly 700 strikers and union officers as result of 1937 strike activities was filed by Republic Steel Corp. in federal district court, Cleveland, last week.

Suit seeks to hold union leaders, their organizations and individual defendants responsible for business lost and extraordinary expenses incurred as a result of an alleged conspiracy in violation of the Clayton act and Sherman act.

Republic charges unlawful acts of force, intimidation, threats, violence, destruction of property, injury of persons and obstruction of commerce to and from the plants were part of a conspiracy to compel the company to sign a proposed collective bargaining contract with SWOC.

Damages directly sustained as a result of the strike activity are set by the petition at a minimum of $2,500,000 and under the Clayton act the company is entitled to recover any proven damages threefold.

Company Cites Losses

Basis of the claim includes losses incurred by the forced closing of plants at Cleveland, Youngstown, Canton and Massillon; the abnormal cost of operating under siege by strikers at Warren, Niles, and some of the Canton plants; the cost of protecting properties and persons against harm by strikers; and the loss of business due to the blockading of plants which meant the loss of sales and the inability to contract for delivery of products over a period of more than six weeks.

Republic cites as evidence of its losses the blockading of employe approaches to its plants, intimidation of employes and presence of armed mobs who forced men going to or from work to run the gauntlet under barrage of stones and other missiles. Defendants are charged with provoking riots at which they and their sympathizers attacked and fired upon law-enforcement officers and with obstructing the mails, blowing up or otherwise destroying railroad tracks and otherwise interferring with shipments to and from the company's plants.

Included among individuals named as defendants are 47 who were arrested and convicted of illegal acts of violence during the 1937 strike.

Similar suit recently was won by Apex Hosiery Co., Philadelphia, which was awarded a $711,932 triple damage verdict against the CIO for losses incurred during a sitdown strike.

That present antitrust legislation may provide employers a new weapon to curb illegal strike activities of unions is indicated by the Apex decision, by the filing of similar suits by three New England trucking companies, and the Republic action. John L. Lewis and the CIO already have started a campaign to amend antitrust laws to exempt labor unions (STEEL, May 15, p. 24).

Republic's suit balances in a sense an action for $7,500,000 filed against the company May 15 by SWOC seeking back wages for strikers who participated in the 1937 shutdown.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended May 27	Change	Same week 1938	Same week 1937
Pittsburgh	36	+ 3	22	94
Chicago	49	+ 3.5	29	75
Eastern Pa.	37	None	27	72.5
Youngstown	45	+ 3	27	30
Wheeling	59	+ 3	41	96
Cleveland	54	+ 4	26	65
Buffalo	42	+ 4.5	21	91
Birmingham	57	None	69	83
New England	45	None	30	55
Cincinnati	52	+ 8	28	90
St. Louis	39	None	33.3	94
Detroit	57	— 2	18	95
Average	48	+ 2.5	28.5	75

Surveys Marketing Research Programs

■ Average manufacturer carrying on marketing research studies spends $21,000 per year for work done within the organization and $8000 a year for marketing research purchased from outside agencies, according to a survey by the commerce department. Survey is based on questionnaires sent to 556 manufacturers of whom 188 were doing research work in the field of distribution.

Report is designed to guide manufacturers who are, or are contemplating, engaging in marketing research programs. Information contained in the study includes amount of expenditures required, different types of research organization, and detailed classification of activities supplemented with illustrations of the actual use of research when applied to practical problems of manufacturers.

Copies may be obtained from the bureau of foreign and domestic commerce, Washington, or from bureau's district offices, for 25 cents.

PRODUCTION

■ STEELWORKS operations last week rose 2.5 points to 48 per cent, the first upward movement in 12 weeks. Substantial advances were made in seven districts, a small loss in one and four showed no change. A year ago the rate was 28.5 per cent; two years ago 75 per cent.

Cleveland—Up 4 points to 54 per cent, highest in two months. Only small changes are indicated this week.

Youngstown, O.—Rise of 3 points to 45 per cent resulted from addition of three open hearths, giving 43 open hearths, three bessemers and eight blast furnaces in production. Further rise of 3 points to 48 per cent or better is expected this week. Steelworks will not close for Memorial day.

Detroit — Down 2 points to 57 per cent, resulting from minor adjustments in size of units operated by one producer. No material change from the prevailing level is in prospect.

Chicago — Advanced 3.5 points to 49 per cent, the first gain since the last week in March. This is the level of the second week in January and compares with 28.5 per cent a year ago. Inland and Carnegie-Illinois each has added a blast furnace.

Birmingham, Ala. — Steady at 57 per cent, with 12 open hearths in production.

St. Louis — Unchanged at 39 per cent, with one producer planning addition of an open hearth this week.

Cincinnati — Gained 8 points to 52 per cent, one open hearth being added to build up ingot stock for a repair shutdown.

Central eastern seaboard — Continues at 37 per cent for the third week, with a leading interest close to 50 per cent.

Pittsburgh — Increased activity by several large producers lifted the rate 3 points to 36 per cent. Further gain is indicated for this week.

Wheeling — Resumption by one plant after a shutdown of a week caused 6 points increase, to 59 per cent.

New England — Holds at 45 per cent for the fourth week. The same schedule is planned for this week.

Buffalo — Rose 4.5 points to 43 per cent as result of heavier orders. Two open hearths have been added.

■ Shipments of household washing machines by manufacturers in April totaled 116,199, compared with 95,158 in April, 1938, an increase of 22.1 per cent, according to the American Washer and Ironer Manufacturers' association.

MESTA WORKING ROLLS FOR FOUR HIGH HOT MILLS

MESTA MACHINE COMPANY, PITTSBURGH, PA.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ DURING his testimony before the temporary national economic committee recently, Edward R. Stettinius Jr., chairman of the board of the United States Steel Corp., was asked the effect of modernization on the number and wages of employes.

Last week Mr. Stettinius filed with the committee the following information in addition to his former testimony:

"Although labor-saving machines, where introduced in the Corporation's plants, do displace hand-labor and turn out more product per hour with a smaller number of operators than was formerly the case, the fact is that the installation of labor-saving machinery has not resulted in a reduction of the number of employes as a whole. At corresponding rates of operation the subsidiaries of the Steel corporation are employing more men at higher rates of pay and with shorter hours of work than ever before in its history.

Employment Goes Up

For an example, in 1929, when the corporation produced over 15,000,000 tons of rolled and finished steel products, it employed 253,138 men whose average earnings were $31.69, the average number of hours worked being 46 hours per week; in 1937, when production was less than 13,000,000 tons, the corporation employed 261,293 men whose average earnings were $32.51, the average number of hours worked being 38 hours per week.

"The explanation of the increase in the number of employes is that hours of labor have been shortened and adaptation of the product to consumer requirements has necessitated further processing with additional men-hours of work. Furthermore, rates of pay have been increased and much of the very arduous hand labor formerly involved has been shifted to the machine with the net result that at comparable output a larger number of employes now enjoy better working conditions and higher earnings than before.

"This does not take into account the indirect increases in general employment both in the manufacture of new equipment and in the subsequent processing of the improved steel products, which have in fact opened up many new fields and extended old fields of employment.

"Many of the products manufactured by the former methods could not be sold today in competition with the superior products now made."

LARGE SUBSIDY URGED TO REBUILD RAILROADS

Railroad equipment makers and sellers through the Railway Business association have prepared for congress a report urging a five-year $550,000,000 annual subsidy to modernize railroad ways, structures and rolling stock.

The report says that after eight years of financial stringency railroads have accumulated an undermaintenance estimated at $1,000,000,000 and are $300,000,000 behind on equipment needs. With fullest possible repairs cars and locomotives would be insufficient to carry loads of 10 to 15 per cent over 1933-37 peaks. The report also asks for carrier consolidations and extension of carrier legislation.

CONFEREES AGREE ON STRATEGIC MATERIALS BILL

Conferees on the strategic materials bill have reached an agreement whereby the senate conferees accepted $100,000,000 for purchase of stockpiles, including manganese, chromium, tin and other essential materials, instead of $40,000,000, as provided in the bill as it passed the senate.

There was considerable misunderstanding about the amount to be appropriated because statement was made on the senate floor when the bill was under discussion that the President would veto the bill if $100,000,000 was provided. It developed, subsequently, that this was incorrect.

Also, the conferees have stricken out of the bill references to barter trade and other tariff matters, so that the bill is much as it passed the senate except for the amount of appropriation.

MURPHY SEEKS TO MAKE CLEAR ANTI-TRUST STAND

In a statement on anti-trust policy which Attorney General Murphy has been promising to newsmen for several weeks, he said last week that his department will endeavor to make its own views as to what the law requires of business men as clear and as unequivocal as possible.

"In this way," he said, "it hopes to be genuinely helpful to business men seeking by voluntary action to eliminate business practices which are economically harmful to industry, to competitors, and to the general public. The department has, of course, no authority to grant immunity from the anti-trust laws or to modify or suspend them.

"In the enforcement of anti-trust laws both civil and criminal remedies are available to the government. In many cases, use of the criminal process is necessary and unavoidable because the criminal penalty at present is the only effective deterrent and also because in many cases a grand jury inquiry is the only means by which the government can obtain satisfactory evidence of widespread law violation. It must be recognized that if injunction by civil decree were the sole consequence of violating the laws they would soon become ineffective. We are agreed that the criminal remedy should not be employed in an irresponsible manner."

He called attention to the proposed bureau of industrial economics about

which the President has spoken several times and in this connection said that "the department is already engaged in conversations with the department of commerce looking towards creation of such a bureau. The research facilities and personnel of such a bureau will be helpful to the department in the intelligent enforcement of the laws and helpful to business generally in maintaining healthy but orderly competition."

AGREE TO SCRAP TAX ON UNDISTRIBUTED PROFITS

Following his statement before the American Retail Federation Forum last week that he would consider changes in taxation under certain conditions, President Roosevelt is said to have reached an agreement with leaders in congress. The understanding reached between the President, Senator Pat Harrison, Mississippi, and Senator James F. Byrnes, South Carolina, included lapse of the 2½ per cent tax on undistributed profits earnings when it expires Dec. 31; substitution of a flat 18 per cent tax on net corporate earnings above $25,000; continuance of nuisance taxes; possible concessions to corporations allowing losses to be passed on for two or three years and increase in present $2000 exemption allowance for losses.

The plan will require approval by the house ways and means committee, as all revenue legislation must originate in that branch.

LAKE BULK SHIPPERS EXEMPTED FROM RAIL BILL

Partial victory was won by Great Lakes shippers when the senate recently adopted an amendment to the Wheeler bill, providing that vessels on the Great Lakes competing with Canadian bulk carriers shall not be subject to rate regulation by the interstate commerce commission.

While shippers sought total exemption for all types of lake carriers, the amendment applies only to bulk carriers transporting iron ore, coal, limestone and grain. However, it is estimated that about 90 per cent of the lake shipping companies and 60 per cent of the annual bulk tonnage would be exempted.

Despite this concession, senate spokesmen for the water carriers are expected to press their fight to recall the Wheeler bill and turn it over to the senate commerce committee for further study.

FOREIGN TRADE WEEK WAS WIDELY OBSERVED

Observance of last week's national foreign trade week was highlighted by a speech of Secretary of Commerce Hopkins at the world trade dinner in New York. The speech was broadcast and sent by short wave stations to all nations of the world.

The week-long program of trade promotion sponsored by the United States chamber of commerce with co-operation of the department of commerce and other government agencies is an annual event. It is estimated that approximately 5000 meetings were held throughout the United States by trade and civic organizations to observe national foreign trade week. Division heads and foreign service officers of the department of commerce made talks at meetings in various parts of the country. W. A. Janssen, chief of the metal and minerals division, addressed a group meeting at Atlanta, Ga.

HOPKINS SEEKS TRAINED BUSINESS MEN AS AIDS

Secretary of Commerce Hopkins has transmitted to congress through President Roosevelt a communication asking for an additional $235,000 appropriation for the coming fiscal year to take care of what he designates an executive staff. The talk in Washington is that he is anxious to bring a corps of businessmen to Washington to help him. Of the amount asked, $225,000 would be for salaries and $30,000 for traveling and for other contingent expenses.

In transmitting the estimate to congress, Harold D. Smith, director of the budget, made the following statement:

"These supplementary estimates are for the purpose of providing a highly qualified executive staff in the department of commerce to participate with the secretary in appraisals of the larger problems that affect the commerce and industry of the country, in assisting congress in drafting and considering legislation affecting business, in maintaining contact with various agencies of the government dealing with particular phases of the national problem having a bearing on affairs of industry, and for developing and carrying through new constructive work, that will be welcomed by business men, directed toward improvement of business conditions at the earliest possible moment.

"The purposes for which these supplemental estimates are submitted require a new kind of ability and a new kind of energy in the department of commerce quite different from that required to carry out the normal administrative functions of the department, and their transmission to congress is recommended."

NAM URGES REPEAL OF WALSH-HEALEY ACT

A. C. Moore, president of the Chicago Railway Equipment Co., appeared on behalf of the National Association of Manufacturers before the senate committee on labor in opposition to amendments to the Walsh-Healey act, as proposed by Senator Walsh.

Mr. Moore not only urged the committee to disapprove the Walsh amendment proposal, but also asked repeal of the entire act. One provision in the Walsh amendment would extend the law to subcontractors on governmental work and to contracts of $2000 or more. The present law covers contracts of $10,000 or more, for which minimum wages may be prescribed by the secretary of labor. Another provision would "blacklist" any contractor or subcontractor held in violation of the national labor relations act or any state labor relations law from participating or holding a government contract.

He summarized the attitude of the association in the following three points:

First: Since congress has enacted a general law regulating minimum wages, maximum hours and the employment of minors, we no longer can understand any necessity for continuation of the Walsh-Healey act. We therefore recommend its repeal.

Second: In the event repeal is not now feasible, we recommend additional amendments to bring the requirements of the act more in conformity with provisions of the fair labor standards measure enacted in 1938.

Third: The NAM opposes any extension of the law such as we believe would be accomplished by certain amendments contained in the Walsh bill (S. 1032).

GOVERNMENT IRON, STEEL PURCHASES TOTAL $545,401

During the week ended May 20, the government purchased $545,401.31 worth of iron and steel products under the Walsh-Healey act as follows: Struthers Wells-Titusville Corp., Titusville Forge Division, Titusville, Pa., $27,932; Baldwin Southwark Corp., Eddystone, Pa., $38,850; Western Pipe & Steel Co. of Calif., San Francisco, $11,919.56; Consolidated Supply Co., Portland, Oreg., $11,807.60; Noland Co. Inc., Washington, $12,820.36; Southwest Welding & Mfg. Co., Alhambra, Calif., $73,024; Bethlehem Steel Co., San Francisco, $114,091; Bethlehem Steel Co., San Francisco, $13,048.24; Republic Steel Corp., Cleveland, $27,291.63; Carnegie-Illinois Steel Corp., Washington, $10,660 (estimated); Columbia Steel Co., San Francisco, $43,725; Bethlehem Steel Co., Los Angeles, $19,270.33; American Bridge Co., Denver, $124,078; and Joseph Lehman Co. Inc., Brooklyn, N. Y., $16,883.59.

AVIATION

AIR DEFENSE CONTRACTS SWELL BUILDERS' BACKLOGS

■ LARGE orders for military aircraft were placed last week by army air corps. Additional awards are expected after start of the new fiscal year July 1.

A $15,000,000 contract went to Douglas Aircraft Co. Inc., Santa Monica, Calif., for all-metal, 400-mile per hour attack-bombers. War department will supply engines, propellers, radio and armament. Its backlog now up to a record $48,000,000, Douglas is assured near-capacity operations for more than a year.

Awards for attack-bombers also were booked by Glenn L. Martin Co., Baltimore, $500,000; and Stearman division of Boeing Airplane Co., Wichita, Kans., $500,000. Ordered from Seversky Aircraft Corp., Farmingdale, L. I., were 13 all-metal, single-seat fighting planes, powered by Pratt & Whitney, and costing $974,324.

Aeronautical equipment allotted last week by the navy: Pratt & Whitney division of United Aircraft Corp., East Hartford, Conn., engines, $570,694, and spare parts, $303,436; Hamilton Standard Propellers division of United, East Hartford, propeller assemblies, $117,125; and Consolidated Aircraft Corp., San Diego, wings, $37,395.

Foreign buying of American transport planes is reported increasing. Recent transactions: Lockheed Aircraft Corp., Burbank, Calif., two Lockheed 14s costing $180,000 for the French air ministry; Beech Aircraft Corp., Wichita, Kans., three twin-motored ships for Tata Airways, India.

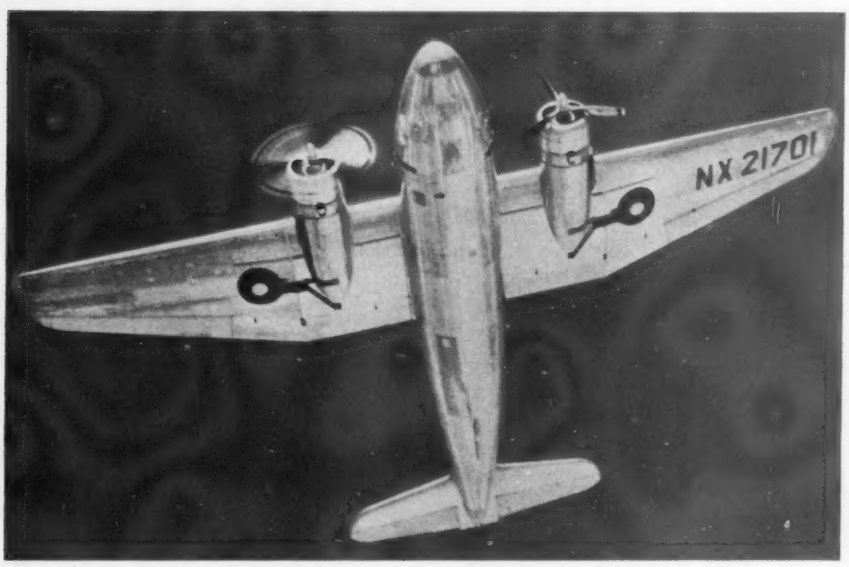
With sizable orders from the navy, Grumman Aircraft Engineering Corp., Bethpage, L. I., is stepping up production and expanding its plant. Vega Airplane division of Lockheed, Burbank, Calif., proposes to erect a 65 x 112-foot assembly building.

Ground has been broken by Ryan Aeronautical Co., San Diego, for a 200 x 275-foot airplane factory estimated to cost $100,000. Structure will comprise steel frame, walls and roof of corrugated sheet, steel doors, crane runway and sprinkler system.

American Aircraft Co., Los Angeles, has acquired the plant and other assets of Security Aircraft Corp., and is to manufacture airplanes and motors. Company is marketing preferred stock, will install new machinery and extend its factory.

Now being organized by a business men's civic association, Du Bois-Martin Aircraft Corp., Du Bois, Pa., plans to build on a 500-acre site an aircraft plant costing more than $200,000 with equipment. Military planes and spare parts will be produced.

New Features Increase Flying Speed



■ **Recent developments in aircraft construction are demonstrated by the new Douglas DC-5 all-metal transport. With one engine operating, propeller of the other is automatically "feathered" into the wind to minimize drag. Shown snugly retracted into wing recesses are rear wheels of the tricycle landing gear, while front wheel has been lifted into the nose. Designed for "feeder lines," plane carries 16 passengers, weighs nearly 10 tons**

MEETINGS

AIME SECTION ANNOUNCES OPEN-HEARTH SESSIONS

■ PITTSBURGH local section, National Open Hearth committee, American Institute of Mining and Metallurgical Engineers, will conduct its sixth open-hearth meeting at the bureau of mines auditorium, Pittsburgh, June 2. An afternoon session will be devoted to open discussions on refractories, steel pouring practice, and open-hearth slag control; the evening session to slag control, acid melting practice, and general practice. Dr. John Chipman, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., will present the only formal address, on "Oxidizing Power of the Slag."

ENGINEERS WILL CONVENE AT SAN FRANCISCO FAIR

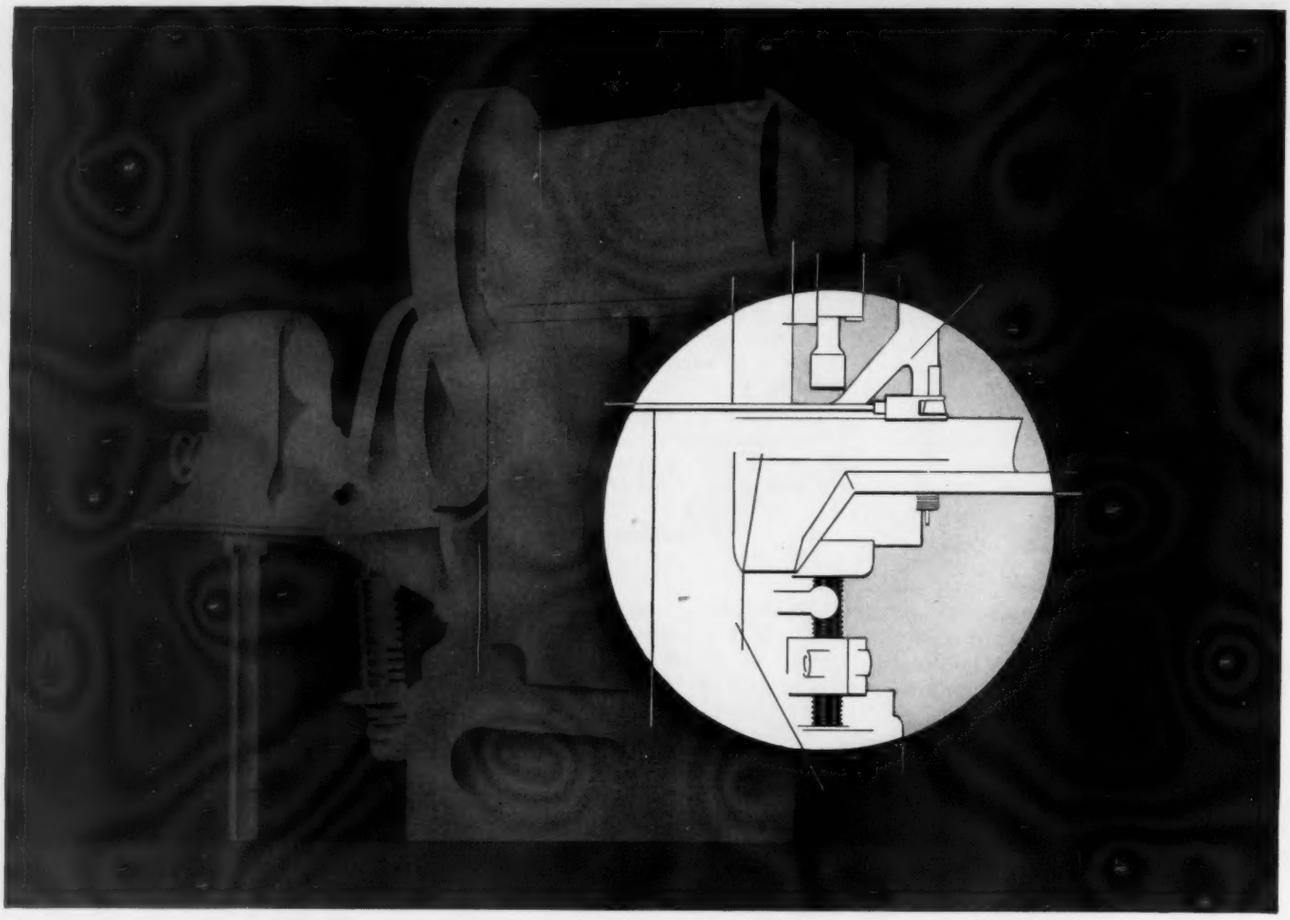
American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, and the American Society of Civil Engineers will hold conventions at the Golden Gate International exposition on San Francisco bay, July 10-17. Engineers' Day, sponsored by the San Francisco Engineering council, will be held at the 400-acre World's fair on Treasure island during the same week. Exhibitors in the mining and engineering field will co-operate by conducting special demonstrations during the conventions.

Continuous Mill Made Less Labor, More Jobs

■ Continuous sheet mills have not reduced employment, Bennett Chapple, assistant to Charles R. Hook, president, American Rolling Mill Co., Middletown, O., told the annual convention of the National Association of Purchasing Agents in San Francisco, May 22.

"Even though men saw their jobs change," said Mr. Chapple, "in the long run they were not forced out by machinery. There are 1.57 jobs today per ton of production, compared to 1.34 in the handmill days, a 15 per cent increase."

The continuous mill met increased demand for steel sheets for automobiles and household appliances, he stated. It took the burden off men's shoulders and put it on the machine. The result was an increase in the proportion of light steel to total output, from 7 per cent in 1918 to 21.5 per cent in 1938. This reflected the larger production of those articles that constantly improve the American standard of living.



TO REDESIGN OR NOT?
THAT WAS THE QUESTION

Finding just the right material for a single trouble-making part sometimes saves redesigning an entire machine; and that means a saving all around.

For example: breakage of the lower die carrier of a 15-ton medicinal pellet press made it look for a while as though some drastic changes in design would be required — with consequent increased manufacturing costs, to say nothing of loss of interchangeability.

Then the manufacturer adopted Chrome-Molybdenum (SAE 4140) Steel, which combines high tensile and shock-fatigue strength. That was two years ago. There has not been a single failure since. Redesigning has been obviated, interchangeability preserved, customers pleased.

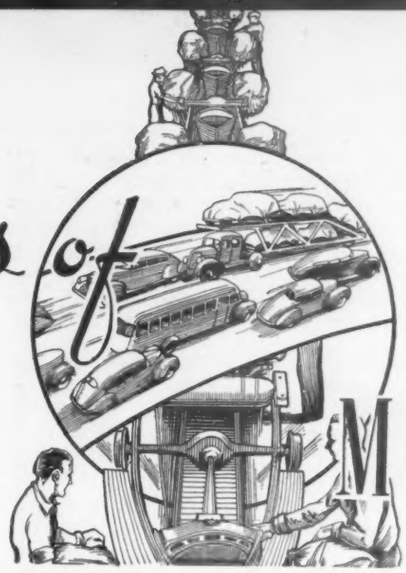
Similarly, Molybdenum Steel may prove the answer to your special service problems. Our technical book, "Molybdenum in Steel", giving practical data, will be sent free on request to production executives and engineers interested in taking advantage of modern steels.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Mo-lyb-den-um Company
500 Fifth Avenue · New York City

MOLY

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ SHREWD planning of Henry Ford once more was vindicated last week as Ford operations continued practically uninterrupted in the face of a labor disturbance which within two days closed 18 major automobile plants and a number of smaller parts plants.

Once dependent upon Briggs Mfg. Co. for a large share of body requirements, Ford is now virtually self-contained in this respect, following completion of the extensive new press and body plant at the Rouge. At the time the latter structure was going up, it was common talk that it represented a hedge against labor disturbances at Briggs, and so it has proved to be. Briggs still supplies some Ford requirements, but not nearly the amount of two or three years ago. Lincoln-Zephyr and Mercury sedan bodies still come from Briggs, and the Lincoln plant has been forced to suspend operations along with ten plants of Chrysler Corp. here and in Indiana which are supplied by the seven closed Briggs plants.

In all, the tieup is estimated to involve 70,000 workmen, as well as the weekly output of some 20,000 automobiles.

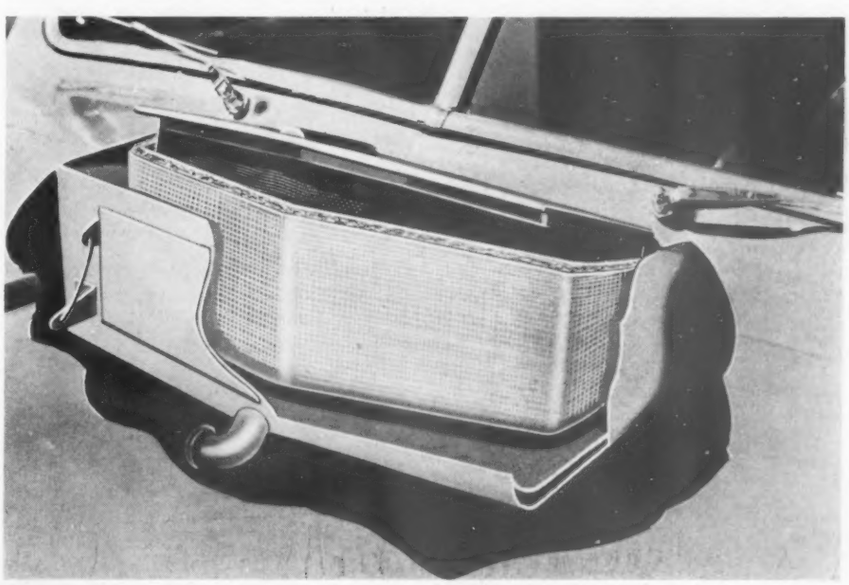
And why a strike at Briggs? Because the company's contract with the UAW expired last Monday, and union representatives walked out of negotiations on a new contract for the stated reason the company would not adjust immediately a list of 30 minor grievances or fancied grievances on the part of individual employes in Briggs plants. After the collapse of negotiations, a strike was called, and within 24 hours all seven Briggs plants were dark and vacant, with small groups of pickets marching in circles outside them, carrying placards with the usual exhortations.

Federal labor concilator James F. Dewey arrived on the scene Tuesday and attempted to bring the warring parties to a meeting, without much success at first. Emil Mazey, Briggs UAW leader, declared: "You have my telephone number; when you are ready to negotiate you can call me."

W. P. Brown, Briggs president, declared that inasmuch as the company's position had been made public several times and was well known to all concerned, he felt the controversy had perhaps passed beyond the point of mediation. The company, in newspaper advertisements and otherwise, has made plain its willingness to arbitrate all grievances and proceed with negotiations on a new contract, but charged that Mazey was trying to "make every employe of Briggs Mfg. Co. pay tribute to him in the form of union dues before he will be permitted to earn his livelihood." This referred probably to the union's demand for a "union shop" clause in a new contract which would require all employes to be members of the UAW-CIO. It is known that the UAW is highly organized at Briggs, likely more so than in other auto plants, but it is doubtful whether the company would want to be the first to grant a union-shop contract in the automotive industry.

These are dark days for Walter O. Briggs, chairman of the company,

Cowl Ventilator Traps Dust and Water



■ **New type of cowl ventilator developed for 1939 De Soto models contains a filtering element which removes dust and dirt from incoming air, plus a special built-in steel trap to catch and drain off water. Clean, dry air thus is admitted to the car interior and no difficulty is experienced if cowl is left open during rainstorms. Heater used in connection is provided with fresh air intakes**

with his Detroit ball club near the bottom in the American League and his seven plants locked up. There may even be some connection between these two apparently unrelated factors, for the "man on the street" in Detroit is an ardent baseball fan, and when his club is losing he is quick to blame the owners and to believe rumors that the "ball club is being run just like the factory," etc. If the Detroit Tigers were leading the American League, a settlement of the Briggs tieup might come a lot more quickly.

Center of Briggs operations is the vast Mack avenue plant where bodies for the various Chrysler divisions are fabricated and assembled, and which has been operating four days per week. The Vernor highway plant is focal point of tool and die activities and about 1200 have been busy here on production tool equipment for 1940 models, chiefly Chrysler. Convertible, limousine and special bodies for Chrysler also are produced here.

Lincoln-Zephyr bodies are assembled in the Meldrum plant on the basis of about 400 per week. Mercury sedan bodies are supplied by the Briggs Highland Park division. The Hamtramck plant concentrates on plumbing ware and has been operating at capacity, with backlogs sufficient for well through the summer.

No Violence So Far

The new accessories division on Eight-Mile road has been supplying moldings and body trim parts, as well as sheet metal fabrication for the plumbing ware division. A plant in Evansville, Ind., also idle, supplies bodies for Dodge and Plymouth midwest assemblies. In all, the company employs about 15,000 men, being the largest nonintegrated automotive supplier in the district.

The strike so far has been marked by total absence of violence. It was called by the CIO wing of the UAW which now appears to have eclipsed the Homer Martin wing, the latter now being in process of taking a referendum on affiliation with the American Federation of Labor. No love is lost between these rival factions of the old UAW, and frequently altercations spring up between them, with the Martin following usually on the losing end.

A completely rewritten labor relations bill, introduced originally in the state legislature by the late Governor Fitzgerald, and passed in rather radical form by the house, later was redrawn by the senate and passed Tuesday. It calls for the appointment of a three-man labor board by Governor Dickinson, but he has not yet approved the bill and has not considered the appointment of any board members. Considerable doubt is expressed locally over the effectiveness of this "football" bill which has been kicked all around the state legislature, and in its present form represents the thinking of a preponderantly heavy farmer majority which may not have much real appreciation of industrial labor problems.

■ SEVERAL tooling and equipment programs of importance are up in plants here, not directly concerned with new automobile models. A Chrysler Corp. division is taking figures on a fair amount of machinery to be used in the manufacture of gun carriages and recoil mechanisms for the government, indicating a good-size order for such armament material either has been received or is pending. Old-timers recall that at the time of the World war, the Dodge truck plant on Lynch road was erected specifically for the manufacture of gun carriages.

Cadillac is in process of tooling up for the machining and finishing of crankshafts, camshafts and connecting rods for the new Allison aviation engine on which government orders for 550 have been received. Allison is rushing construction of a new engine plant in Indianapolis, with completion scheduled for around Sept. 1. However, Cadillac will supply the above-mentioned parts, and is setting up facilities for production of 20 units per 16-hour shift. Large size of these parts (crankshaft has a finished weight of 110 pounds) and the precision necessary call for special attention to equipment and tooling.

General Motors is inquiring for a large volume of equipment to outfit a new automatic transmission plant here in Fisher Body building No. 10 on Farnsworth street. Some of the machinery may be moved in from Fisher plant 66 in Flint, equipped several years ago at a cost of around $1,000,000 for production of the optional Olds and Buick automatic transmission. Buick subsequently discarded offering this transmission, although it still is available on Olds. However, the transmission to be made in Detroit is understood to be of entirely new design of the hydraulic type, possibly along the lines of the hydraulic transmission developed for buses built by Yellow Truck & Coach division of GM in Pontiac. What cars in the GM line will offer this new transmission and how much it will cost are not yet known, but the size of the tooling program would indicate a fair degree of production on the item.

■ PONTIAC general sales manager C. P. Simpson has resigned and will remove to Houston, Tex., to take charge of a dealership there. He is succeeded by Don U. Bathrick, active with General Motors since 1927, and since 1934 assistant general sales manager for Pontiac in charge of the eastern area.

Two years of metallurgical research on the corrosion of aluminum cylinder heads will be summarized in a report to be given at the June meeting of the Aluminum association in Chicago. An advance report reveals aluminum cylinder head corrosion in general is not a serious problem except in certain specified areas of this country where waters of high chloride content are found. The report also discloses that occasionally amounts of chloride large enough to cause objectionable corrosion are present in automobile cooling systems when cars leave assembly lines, due to the use of soldering fluxes or sal ammoniac for sealing porous castings. A proper soluble oil corrosion inhibitor will reduce difficulties on this score even in the presence of adverse water conditions.

Declared Alfred P. Sloan Jr., General Motors chairman, before the temporary national economic committee of the senate in Washington, "I see no end to the auto industry's advancing technology. So long as we are aggressive and intelligent, we should continue to expand in that respect steadily for the next 15 or 20 years, producing better cars for the same money or the same car for less money." After 1960, what?

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
April	553,231	238,133	*354,263
4 mos.	1,855,339	906,475	1,409,839
May	540,377	210,183	.....
June	521,153	189,399	.....
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Revised.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
April 29	86,640	50,755
May 6	71,420	53,385
May 13	72,375	47,415
May 20	80,145	46,810
May 27	67,740	45,120

†Comparable week.

	Week Ended	
	May 27	May 20
General Motors	31,680	31,885
Chrysler	5,650	17,900
Ford	20,350	20,630
All others	10,060	9,730

FABRICATING
MACHINING
ASSEMBLING
FINISHING

4 PRODUCTION DOLLARS
A *Quiz*

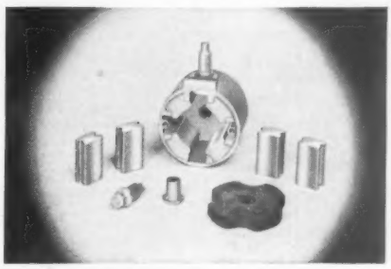
FABRICATING DOLLAR

Q How can I get the most out of my fabricating dollar if I adopt die cast parts?

A Get in touch with your die caster as early as possible in the design stage. He can often make suggestions for slight design changes which will result in substantial savings in production costs.

ASSEMBLING DOLLAR

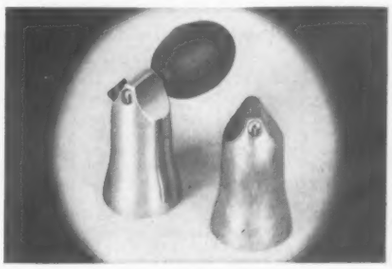
Q Is it possible for me to make use of inserts in ZINC Alloy Die Castings to stretch my assembling dollar?



A This magneto generator part called for 4 pole pieces of soft steel, an aluminum-nickel disk, a bronze bushing, and a steel support stud. These elements (all shown in the foreground) were inserted in the die casting die and a ZINC Alloy housing was cast around them. Result—7 assembly operations saved.

FINISHING DOLLAR

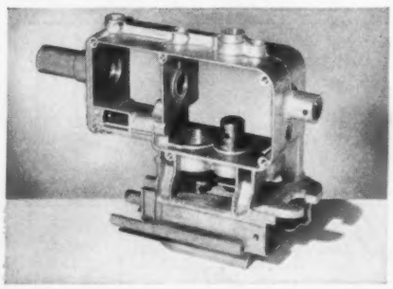
Q Can I be assured that the properties of ZINC Alloy Die Castings will also provide the maximum value per finishing dollar?



A If your die cast part requires a plated, organic, plastic or decalcomania coating, its smooth as-cast surface will make it economical to apply the finish — and will provide long service life. The die cast atomizer body pictured above has been given a lustrous chromium plate.

MACHINING DOLLAR

Q Can I expand my machining dollar by utilizing ZINC Alloy Die Castings?



A Note the complexity of this die cast washing machine gear frame. There is no other metal production method that can achieve such intricacy of design in one piece — without prohibitive machining costs.

THE THEME of this advertisement is production economy, but it would be a mistake for the reader to evaluate ZINC Alloy Die Castings on the basis of economy alone. The physical characteristics of these metal parts are a kindred story — an impressive one. For further information consult any commercial die caster — or write to The New Jersey Zinc Company, 160 Front Street, New York City.

ZINC ALLOY DIE CASTINGS

The Research was done, the Alloys were developed, and most Die Castings are specified with

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

1938 Production of Steel Ingots, Castings, and Various

All Figures in Gross Tons

ANNUAL STEEL PRODUCTION (Ingots and Steel for Castings)

Years	Open hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1920	31,375,723	1,296,172	32,671,895	8,883,087	72,265	505,687	42,132,934
1925	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	45,393,524
1926	39,653,315	1,038,664	40,691,979	6,934,568	15,493	651,723	48,293,763
1927	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	44,935,185
1928	43,200,483	913,473	44,113,956	6,620,195	7,769	802,260	51,544,180
1929	47,232,419	1,120,469	48,352,888	7,122,509	6,645	951,431	56,433,473
1930	34,268,316	780,856	35,049,172	5,035,459	2,253	612,599	40,699,483
1931	22,130,398	379,168	22,509,566	3,023,446	1,547	410,942	25,945,501
1932	11,742,682	164,648	11,907,330	1,532,076	645	241,111	13,681,162
1933	20,067,146	324,526	20,381,672	2,428,791	681	421,203	23,232,347
1934	23,256,417	274,688	23,531,105	2,162,357	531	361,296	26,055,289
1935	30,361,237	354,192	30,715,429	2,835,031	642	541,492	34,092,594
1936	43,114,826	421,302	43,536,128	3,458,457	816	772,455	47,767,856
1937	45,772,510	499,793	46,272,303	3,449,927	934	845,537	50,568,701
1938	25,691,963	272,337	25,964,300	1,880,661	6	505,024	28,349,991

ANNUAL STEEL INGOT PRODUCTION

Years	Open hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1920	30,926,393	759,102	31,685,495	8,778,107	70,536	347,254	40,881,392
1925	36,632,060	484,843	37,116,903	6,670,128	17,729	335,978	44,140,738
1926	39,172,688	533,285	39,705,973	6,891,502	13,452	325,278	46,936,205
1927	36,750,387	493,653	37,244,040	6,153,703	7,696	371,278	43,776,717
1928	42,818,557	454,883	43,273,440	6,591,745	6,516	453,692	50,325,393
1929	46,644,206	576,393	47,220,599	7,091,680	5,762	532,392	54,850,433
1930	33,896,518	367,181	34,265,699	5,020,588	1,563	307,418	39,595,268
1931	21,986,933	194,388	22,181,321	3,011,394	831	235,376	25,428,922
1932	11,689,495	104,794	11,794,289	1,528,544	241	141,326	13,464,402
1933	19,972,805	195,495	20,168,300	2,425,779	399	299,808	22,894,286
1934	23,235,688	201,073	23,436,761	2,162,357	531	349,095	25,948,744
1935	30,334,442	248,512	30,582,954	2,835,031	642	521,818	33,940,445
1936	43,070,917	278,406	43,349,323	3,458,457	816	704,213	47,512,809
1937	45,719,507	333,473	46,052,980	3,449,927	934	814,310	50,318,151
1938	25,666,719	194,845	25,861,564	1,880,661	6	468,610	28,210,841

PRODUCTION OF DUPLEX STEEL

Years	Gross tons	Years	Gross tons	Years	Gross tons
1920	3,279,119	1929	2,961,292	1934	591,373
1925	2,797,318	1930	2,045,277	1935	960,020
1926	2,815,980	1931	945,844	1936	2,099,102
1927	2,184,674	1932	289,263	1937	2,907,890
1928	2,232,197	1933	386,154	1938	1,183,623

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1920	1,591,939	68,353	1,660,292	1932	757,560	41,044	798,604
1925	2,320,390	112,583	2432,973	1933	1,475,400	71,783	1,547,183
1926	2,317,313	146,101	2,463,414	*1934	1,595,544	16,731	1,612,275
1927	2,385,904	145,844	2,531,748	1935	2,087,427	32,231	2,119,658
1928	3,045,225	169,684	3,214,909	1936	2,788,100	95,522	2,883,622
1929	3,764,287	192,920	3,957,207	1937	2,975,598	57,028	3,032,626
1930	2,317,183	126,128	2,443,311	1938	1,434,801	41,547	1,476,348
1931	1,366,010	89,903	1,455,913				

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES

Processes	1935	1936	1937	1938
Open hearth steel—basic	1,633,541	2,239,885	2,285,000	1,052,706
Open hearth steel—acid	73,400	115,766	146,835	91,151
Bessemer steel	.....	.....	.....	12
Crucible steel	154	209	241	4
Electric steel	412,563	527,762	600,550	332,475
Total	2,119,658	2,883,622	3,032,626	1,476,348

*The figures for 1934 and subsequent years include only that portion of the steel for castings which was produced in foundries operated by companies producing steel ingots.

PRODUCTION OF TIN AND TERNE PLATE AND LONG TERNE SHEETS

Years	Tin plate	Iron and steel terne plate and long terne sheets			Grand total
		Terne plate	Long terne sheets	Total	
1920	1,374,979	35,700	34,866	70,566	1,445,545
1925	1,544,007	40,654	73,134	113,788	1,657,795
1926	1,674,322	39,922	68,062	107,984	1,782,306
1927	1,583,383	37,043	68,023	105,066	1,688,449
1928	1,714,990	33,578	90,637	124,215	1,839,205
1929	1,816,223	38,842	113,215	152,057	1,968,280
1930	1,660,325	20,585	82,533	103,118	1,763,443
1931	1,392,227	15,581	51,135	66,716	1,458,943
1932	986,217	10,882	35,408	46,290	1,032,507
1933	1,685,826	18,969	64,303	83,272	1,769,098
1934	1,502,918	32,983	67,328	100,311	1,603,229
1935	1,695,159	87,841	103,439	191,280	1,886,439
1936	2,103,153	127,056	125,352	252,408	2,355,561
1937	2,418,190	144,295	124,643	268,938	2,687,128
1938	1,430,071	114,131	73,342	187,473	1,617,544

PRODUCTION OF HOT ROLLED IRON AND STEEL PRODUCTS BY STATES

States	1934	1935	1936	1937	1938
Maine, Mass., Rhode Island, Conn.	158,559	198,790	246,916	230,902	135,562
New York	800,338	959,095	1,440,038	1,831,579	970,652
New Jersey	86,466	94,097	111,047	113,002	75,027
Pennsylvania	5,619,410	6,521,515	10,032,035	11,167,740	5,877,802
Delaware, Md., Va.	788,824	977,361	1,367,012	1,768,734	1,297,563
West Virginia	797,039	1,045,051	1,191,403	1,125,382	725,686
Kentucky, Tenn., Ga., Texas	401,305	571,732	658,761	594,730	367,395
Alabama	628,409	728,390	1,087,414	1,268,175	1,001,121
Ohio	4,301,239	5,401,948	7,697,296	7,754,938	4,642,866
Indiana	2,446,052	3,276,717	4,431,090	4,896,446	2,588,685
Illinois	1,311,243	1,890,251	2,510,249	2,771,172	1,360,097
Michigan, Wis., Minn.	923,724	1,467,362	1,708,914	1,980,842	1,137,525
Missouri, Okla.	167,112	201,360	315,691	288,808	193,528
Colorado, Wash.	246,999	283,793	534,533	545,052	255,599
California, Canal Zone	292,787	347,090	463,980	428,887	356,455
Total	18,969,506	23,964,552	33,801,379	36,766,389	20,985,563

PRODUCTION OF HOT ROLLED IRON AND STEEL PRODUCTS IN 1938

	Gross tons
Flat Rolled Products:	
Plates (sheared and universal)	1,714,138
Sheets	4,745,419
Strip	1,030,233
Hoops	66,588
Cotton ties and baling bands	34,042
Strip and sheets for cold reduced black plate and tin plate	1,503,183
Black plate	824,320
Total	9,917,923
Bars:	
Merchant	2,327,840
Concrete reinforcement	783,698
Total Bars	3,111,538
Structural shapes	1,859,540
Sheet piling	110,959
Rails	622,895
Long splice bars, tie plate bars, etc.	198,665
Skelp	1,253,161
Blanks or pierced billets for seamless tubes	1,320,474
Wire rods	2,108,598
Car wheels (rolled steel)	58,255
Cross ties	7,403
Rolled forging blooms, billets and axle blanks	265,512
Blooms, billets, slabs and sheet bars for export	110,585
All other finished hot rolled products	40,055
Total	7,956,102
Grand total	20,985,563

Forms of Finished Products, Announced by Steel Institute

All Figures in Gross Tons

PRODUCTION OF FLAT HOT ROLLED PRODUCTS BY CLASSES

	1935	1936	1937	1938
PLATES:				
Universal	439,362	676,799	836,226	341,633
Sheared	1,015,983	1,849,942	2,407,022	1,372,506
TOTAL	1,455,345	2,526,741	3,243,248	1,714,138
Black sheets	5,175,557	6,995,905	7,839,506	4,745,419
Hoops	89,852	109,279	102,932	66,588
Cotton ties and baling bands	24,719	37,781	62,515	34,042
Strip	2,647,589	3,224,916	2,895,561	1,030,233
Strip and sheets for cold reduced black plate and tin plate	.....	.....	.....	1,503,183
TOTAL	7,937,717	10,367,881	10,900,514	7,379,465
BLACK PLATE:				
For tinning and terne plate	1,794,718	2,283,378	2,610,385	741,176
All other	265,516	346,293	343,701	83,144
TOTAL	2,060,234	2,629,671	2,954,086	824,320
GRAND TOTAL	11,453,296	15,524,293	17,097,848	9,917,923

PRODUCTION OF PLATES, SHEETS AND STRIP BY SIZES

	1935	1936	1937	1938
	(a)	(a)	(a)	(a)
UNIVERSAL PLATES:				
Over 6" to 48" wide—¼" and thicker	385,326	601,134	749,791	308,788
Over 48" wide—0.1875" and thicker	54,036	75,665	86,435	32,845
TOTAL	439,362	676,799	836,226	341,633
SHEARED PLATES:				
Over 6" to 48" wide—¼" and thicker	366,680	678,348	758,089	414,330
Over 48" wide—0.1875" and thicker	649,303	1,171,594	1,648,933	958,175
TOTAL	1,015,983	1,849,942	2,407,022	1,372,506
Black sheets (c)	.....	.....	.....	4,745,419
STRIP (d):				
To and including 6" in width	852,856	1,009,472	920,477	450,478
Over 6" and including 24" in width	1,794,733	2,215,444	1,975,084	(b)579,755
TOTAL	2,647,589	3,224,916	2,896,561	1,030,233

(a) New classification adopted January 1, 1938.

(b) Over 6" to and including 12" from January 1, 1938.

(c) Hot-rolled sheets—3½" and less in width by 0.0254" and less in thickness; over 3½" to 6" inclusive in width by 0.0343" and less in thickness; over 6" to 12" inclusive in width by 0.0567" and less in thickness; over 12" to 32" in width by 0.2499" to 0.0142" inclusive in thickness; over 32" to 48" inclusive in width by 0.2499" and less in thickness; over 48" in width by 0.1874" and less in thickness.

(d) Hot-rolled strip—3½" and less in width by 0.2499" to 0.0255" inclusive in thickness; over 3½" to 6" inclusive in width by 0.2499" to 0.0344" inclusive in thickness; over 6" to 12" inclusive by 0.2499" to 0.0568" inclusive in thickness.

PRODUCTION OF IRON AND STEEL MERCHANT BARS

Years	Total	Years	Total
1929	6,459,896	*1934	2,802,427
1930	4,131,973	*1935	3,699,057
1931	2,440,363	*1936	5,062,948
1932	1,313,896	*1937	5,186,704
1933	2,284,776	*1938	2,327,840

*Includes bolt, nut and rivet, spike and chain, toe calk, horseshoe, finger, staybolt and all other miscellaneous bars which in 1933 and prior years were included in "all other" miscellaneous hot rolled products.

PRODUCTION OF IRON AND STEEL CONCRETE REINFORCEMENT BARS

Years	Rolled from new steel	Rolled from old material	Total
1929	*	*	963,600
1930	682,681	167,470	850,151
1931	500,055	143,578	643,633
1932	275,115	110,490	385,605
1933	294,349	75,924	370,273
1934	383,627	103,377	487,004
1935	405,313	152,047	557,360
1936	820,523	208,040	1,028,563
1937	677,256	167,301	844,557
1938	649,261	134,437	783,698

*Data not available.

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES

Years	Heavy shapes	Light shapes	Total	Years	Heavy shapes	Light shapes	Total
1929	4,055,615	722,405	4,778,020	1934	1,131,133	293,907	1,425,040
1930	3,010,847	501,626	3,512,473	1935	1,303,613	446,127	1,749,740
1931	1,768,374	294,484	2,062,858	1936	2,216,319	681,312	2,897,631
1932	782,570	154,658	937,228	1937	2,546,582	730,264	3,276,846
1933	853,914	255,543	1,109,457	1938	1,476,471	383,069	1,859,540

PRODUCTION OF NAILS

Years	Wire nails	Cement coated wire nails (a)	Cut nails and cut spikes
1929	584,868	94,587	23,832
1930	426,849	67,327	20,532
1931	338,507	49,320	14,164
1932	240,811	33,063	12,759
1933	398,513	51,495	15,600
1934	276,634	37,255	15,599
1935	396,068	46,697	17,632
1936	532,142	63,159	23,495
1937	485,115	62,941	21,808
1938	430,339	41,726	17,555

(a) Included in production of wire nails.

PRODUCTION OF SEAMLESS, LAP-WELD, BUTT-WELD, AND ELECTRIC-WELD PIPE AND TUBES IN 1938

SEAMLESS PIPE AND TUBES*

	Standard pipe	Line pipe	Oil country goods	Boiler tubes	Mechanical tubes	Miscellaneous	Total
Hot finished†	49,965	162,923	769,713	49,772	33,970	8,037	1,074,380
Cold drawn	1,752	763	1,317	22,499	38,887	599	65,817
Total	51,717	163,686	771,030	72,271	72,857	8,636	1,140,197

LAP-WELD, BUTT-WELD AND ELECTIC-WELD PIPE AND TUBES*

Lap-weld ¶	140,259	66,854	58,602	10,454	.....	5,731	281,900
Butt-weld ¶	617,650	11,637	568	.....	.....	11,688	641,543
Electric-weld ¶	58,545	15,448	93,837	.....	26,625	45,890	240,345
Total	816,454	93,939	153,007	10,454	26,625	63,309	1,163,788

*Production of black pipe, including stainless steel pipe and black pipe subsequently galvanized, sherardized, or enameled.

†Does not include hot finished tubes subsequently cold drawn.

¶Includes Iron and Steel.

MEN OF INDUSTRY

■ JAMES P. GILL, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa., has been nominated for president, American Society for Metals, to succeed W. P. Woodside, vice president, Climax Molybdenum Co., Detroit. Mr. Gill is present vice president and had previously served as a trustee.

Oscar E. Harder, assistant director, Battelle Memorial institute, Columbus, O., is the nominee for vice president. Dr. Harder was a trustee several years ago. Dr. Kent R. Van Horn, research metallurgist, Aluminum Co. of America, Cleveland, was nominated for treasurer for two years.

Nominees for trustee for two years are Dr. Marcus A. Grossmann, director of research, Chicago district, Carnegie-Illinois Steel Corp., Chicago, and Herbert J. French, in charge of alloy steel and iron development, International Nickel Co. Inc., New York. These selections were made at a meeting of the nominating committee in Chicago, May 19. Nomination to the offices virtually assures election at the National Metal congress in Chicago, Oct. 23-27.

♦

N. A. Feldman has been appointed office manager and purchasing agent, Claud S. Gordon Co. of Ohio, Cleveland.

♦

Robert A. Neal, formerly assistant to vice president, has been appointed manager, switchgear division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Neal has been associated with Westinghouse since 1910, when he was graduated as an electrical engineer from University of New Hampshire. In 1926 he was advanced to sales manager for all switchgear apparatus. He held this position until 1931 when he became manager, central station sales department, later to be named assistant to vice president.

Robert A. Neal

James P. Gill

♦

K. J. T. Ekblaw, the past ten years agricultural engineer, American Zinc institute, Chicago, has been elected president, American Society of Agricultural Engineers.

♦

Robert W. Conder, active in labor negotiations between the Chrysler Corp., Detroit, and its employes, has been named director of labor relations of the corporation.

♦

O. R. Harpole has been appointed district salesman in St. Louis, and Joe Sabourin Jr., in Kansas City, by USL Battery Corp., Niagara Falls, N. Y.

♦

W. H. Gibb, 101 North Thirty-third street, Philadelphia, has been appointed sales representative in Delaware and eastern Pennsylvania by the C. M. Kemp Mfg. Co., Baltimore.

♦

L. B. Genebach, vice president, United Steel & Wire Co., Battle Creek, Mich., has been reappointed a member of the public relations committee, National Association of Manufacturers.

♦

C. C. Carlton, vice president, Motor Wheel Corp., Lansing, Mich., has been re-elected president, Automotive Parts and Equipment Manufacturers' association, his sixth consecutive term.

♦

Hunter Hicks, the past five years vice president, Merchants Steel & Supply Co., scrap iron and steel broker, Chicago, has been elected president, succeeding his father, the late E. John Hicks. E. J. Hicks Jr. has been elected secretary-treasurer.

♦

Dr. Jesse E. Stareck, engaged in research at the laboratories of United Chromium Inc., Waterbury, Conn., was recently awarded the Edward Longstreth medal by the Franklin institute, Philadelphia, for his discovery of electrolytic color plating.

♦

Jack R. Forcheimer, Jack R. Forcheimer & Son, St. Louis, and John F. Malloy, Malloy & Schreiner, Philadelphia, have been named chairman and vice chairman, respectively, traffic committee, Institute of Scrap Iron and Steel Inc., New York.

♦

Robert L. Heath, metallurgist, Allison Engineering Co., Indianapolis, has been elected head of the Indianapolis chapter, American Society for Metals. Other officers: Vice chairman, Daniel B. Nelson, Monarch Steel Co.; secretary, Preston B. Jenson, International Harvester Co.; treasurer, Axel Weydell.

♦

Leonard E. Nichols, formerly chief welding engineer, National Electric Welding Machines Co., Bay City, Mich., has been named technical advisor and sales engineer, Detroit district sales division. Offices of that division have recently been moved from the Stormfeltz-Lovely building to room 6-255 General Motors building.

♦

Karl A. Zollner has been made assistant sales manager, hardware products division, Wickwire Spencer Steel Co. and its subsidiary, the American Wire Fabrics Corp. Mr. Zollner, who has been associated with the advertising department of the two companies the past 12 years, will continue to direct the advertising and promotional activ-

Karl A. Zollner

ities, with offices at the companies' new location, 500 Fifth avenue, New York.

♦

Edwin J. Schwanhausser, associated with Worthington Pump & Machinery Corp., Harrison, N. J., since graduation from Stevens Institute of Technology in 1915, has been elected a vice president. Mr. Schwanhausser served in a number of capacities, being appointed assistant works manager in 1927. In 1929 he was transferred to the Buffalo works as works manager which position he now holds. As vice president and works manager he will continue in his present responsibilities.

♦

George F. Emanuels, 617 Western Mutual Life building, Los Angeles, has been appointed district

Charles Heggie

Who was elected president, American Steel Warehouse association, as noted in STEEL, May 22, page 43. Mr. Heggie is president of Scully Steel Products Co., Chicago, a United States Steel Corp. subsidiary

representative in southern California by Standard Tube Co., Detroit. Mr. Emanuels was formerly with Republic Steel Corp. on the Pacific coast.

A. E. Garnjost, 544 Market street, San Francisco, has been named district representative in northern California by Standard Tube.

♦

J. B. Carswell has resigned as president and director, Burlington Steel Co. Ltd., Hamilton, Ont., owing to his decision to reside in Europe. H. J. Stambaugh has been elected president and F. C. O'Brien has been added to the board of directors. Mr. Stambaugh has been with the company since 1922, the past two years as general manager, while Mr. O'Brien joined the company 20 years ago and has been sales manager the past two years.

♦

Dr. Paul Leslie Hoover, director of the engineering experiment station at Rutgers university, has been named professor and head of the department of electrical engineering, Case School of Applied Science, Cleveland, effective July 1. He succeeds Prof. Henry B. Dates who is retiring with the title of professor emeritus.

Willard H. Cobb

Who has been named general manager, mechanical goods and general products divisions, United States Rubber Co. Inc., New York, as noted in STEEL, May 15, page 31

♦

Stanley Michaelson, engineer in the mining division of Allis-Chalmers Mfg. Co., Milwaukee, has been transferred to the company's Salt Lake City, Utah, district office where he will serve as sales engineer, specializing in mining and related machinery. Associated with Allis-Chalmers since 1935, Mr. Michaelson at first was in charge of the company's mineral research laboratories, and the past three years has handled a wide variety of mining machinery involving many complete plants.

This corrects the previous notice in STEEL, May 15, page 29, to the effect Mr. Michaelson was made manager of the Salt Lake City district.

♦

W. S. MacNabb, superintendent of industrial relations, Gary works, Carnegie-Illinois Steel Corp., has been appointed assistant division superintendent, open hearths and central mills.

Other changes in personnel at the Gary works are as follows: T. J. Griffin, formerly superintendent of central mills, has been named assistant to division superintendent, open hearths and central mills. T. H. Sanderson will be the new assistant to superintendent, rail mills. He formerly was contact representative, metallurgical division, Chicago office. Stanley J. Brown, previously an inspection foreman, has been named foreman of the finishing and shipping department of the rail mill. Forest J. Smith, assistant superintendent of industrial relations, has become superintendent, succeeding Mr. MacNabb. Walter Bennett, assistant to division superintendent, open hearths and central mills, in charge of personnel matters, will be assistant superintendent of industrial relations. Edgar N. Yost, assistant chief inspector, has been promoted to chief inspector, and J. S. McMahon, who has been stripper and mold yard foreman at No. 3 open hearth, becomes assistant to division superintendent, open hearths and central mills, in charge of personnel matters.

DIED:

■ JAMES E. LEWIS, 66, since 1937 chairman of the board, Harbison-Walker Refractories Co., Pittsburgh, in that city, May 25. He had been in ill health many months. Mr. Lewis also served as president until a few weeks ago. He had been associated with Harbison-Walker about 52 years, advancing to the presidency through both operating and sales capacities. He was a director, American Refractories institute, and at one time served as president of that organization.

♦

William Clifford Stevens, 55, since 1930, vice president in charge of engineering, secretary and a director, Cutler-Hammer Inc., Milwaukee, in that city, May 15. Mr. Stevens joined Cutler-Hammer in 1906 in the engineering department at Milwaukee, following graduation from Cornell university. In 1907 he was transferred to the Pittsburgh sales office, subsequently being made district manager, western division; eastern district manager, and general sales manager. In 1924 he was placed in charge of the development department which position he held six years. Mr. Stevens had a fellowship with the American Institute of Electrical Engineers, and also was a director, Globe Union Inc., Milwaukee.

♦

John J. McHugh, 70, foreman for the American Steel & Wire Co., Cleveland, for 40 years until his retirement, May 13 in that city.

♦

Charles H. Strawbridge, 67, president, Goodman Mfg. Co., maker of mine machinery, Chicago, May 16 in that city. He was a director, Illinois Manufacturers association, and former president, National Metal Trades association, Chicago.

♦

Charles R. Rauth, 58, secretary, treasurer and a director, United States Pipe & Foundry Co., Burlington, N. J., May 16 at his home in Edgewater Park, N. J. He had been with the company since its formation in 1899.

Editorial

The President Asks Questions

■ RECENTLY the President called on the temporary national economic committee to find the reason for economic depression in the United States—to "ascertain why a large part of our vast reservoir of money and savings remains idle in stagnant pools." The President emphasized the need for busy dollars. "Idle dollars profit no one," he said.

"Is it because our economy is leaving an era of rapid expansion and entering an era of steadier growth, calling for relatively less investment in capital goods?" he asked. "Is it because of lag, leak and friction in the operation of investment markets which pervert the normal flow of savings into non-productive enterprise? These are questions for your committee to answer. I know of no more urgent ones in the country today."

The President is right. There are no more important questions confronting the country today than these. The need is for busy dollars. The need is for investment of money on a large scale to provide widespread employment and resuscitate public purchasing power. It generally is the accepted belief that if this basic need were fulfilled, most of our other national problems would become relatively simple.

Theoretical Solutions Failing, Simple Business Methods Offer Way Out

Mystifying is the insistence by the present administration that the solution of our economic problems must be entrusted only to those who believe this basic problem can be solved only by governmental controls. The above questions, for example, are addressed, not to authorities on business economics but to a government group whose knowledge of business economics is the result of a theoretical or political approach. This is said without any aspersion on members of the temporary national economic committee, who have given indications they are genuinely concerned with the solution of the country's economic ills.

That the administration has not been acting on advice from the right sources clearly is reflected by the extent to which government spending has piled up a huge mounting, national debt without curtailing unemployment or otherwise improving the plane of life in this country. Is it not time, therefore, to abandon the approach that hitherto has been made on our economic problems and present some of these questions to business executives. Most of these men believe that the obstacles to recovery could be removed almost overnight, and by rather simple means. They believe all that is needed is government policies aimed at encouraging profits on industrial investments.

Key to Recovery Problems Lies in Co-operation with Private Industry

STEEL believes that President Roosevelt quickly would get the key to the recovery problem if he would call into joint session a responsible group of business and industrial leaders and address them as follows:

"Gentlemen: Approximately 10,000,000 employable men and women today are without jobs. This is the basic fact underlying our reduced public purchasing power, the relief problem, the farmer problem and all our other present-day economic problems. I want private industry to put all these people to work at desirable wages. I want you manufacturers to report to me within two weeks what assistance you require from the government that will enable you to put 1,000,000 of these unemployed back at work by the end of this year and that will enable you to put them all back at work within two years. Every legitimate assistance that you require toward this end will be yours."

The BUSINESS TREND

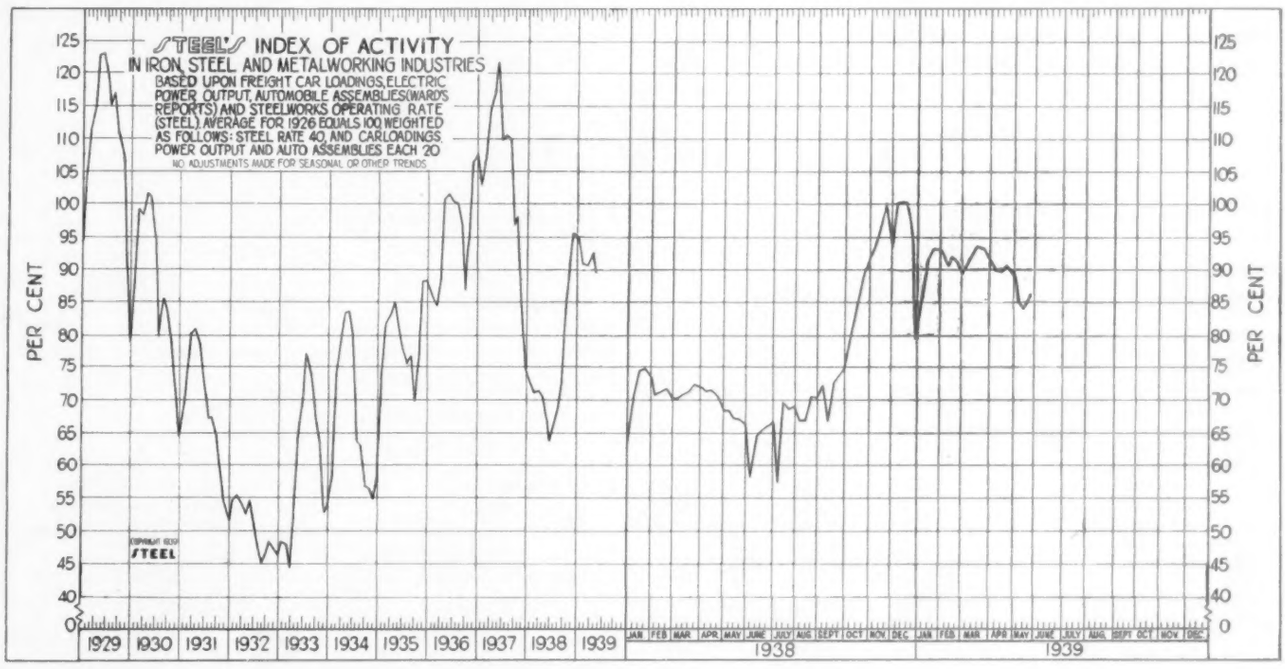
Activity Index Reverses Downward Tendency

■ REFLECTING encouraging gains in revenue freight carloadings and automobile production, STEEL's index of activity advanced 2.4 points to 86.6 for the week ended May 20. This recent upturn recorded by the index reverses the downward tendency, with but one exception, of the preceding eight weeks. Despite the fact industrial activity has receded substantially since the closing months of 1938, it remains well above the level recorded at this time last year.

Steelmaking operations eased 1.5 points to 45.5 per cent in the week ended May 20, thus continuing the downward movement which got underway in the week ended March 28. Excluding the holiday week ended Dec. 31, the recent decline in the national steel rate forced this industrial indicator to the lowest level since the week ended Sept. 10, 1938. However a reversal of the downward movement in steelworks operations is anticipated for the week ended May 27 and there are sound indications that still further gains will be recorded through the remainder of this quarter.

Automobile production registered an encouraging gain to 80,145 units in the week ended May 20. This gain in assemblies increased the spread over the corresponding week last year to 33,335 units. While in some instances the improvement in auto output reflects a better volume of sales, the rise is considered only temporary.

Reflecting the resumption of soft coal shipments, rev-


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939
STEEL

STEEL'S index of activity gained 2.4 points to 86.6 per cent in the week ended May 20:

Week ending	1939	1938	Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Mar. 4	91.5	70.1	Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Mar. 11	92.7	70.8	Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
Mar. 18	93.3	71.3	March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
Mar. 25	93.2	72.4	April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
April 1	92.2	72.0	May	....	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
April 8	90.0	71.3	June	....	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
April 15	89.7	71.4	July	....	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
April 22	90.4	70.8	Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
April 29	89.2	68.4	Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
May 6	85.1	68.5	Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
May 13	84.2	67.2	Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
May 20	86.6	67.1	Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

enue freight carloadings increased contra-seasonally to 615,966 in the week ended May 20. This is the highest volume of freight traffic since the week ended Dec. 10, when loadings totaled 619,340. A year ago railroad car loadings of 545,808 were well below the current level. Electric power consumption remained substantially unchanged during the week ended May 20. Power output in that week of 2,170,496,000 kilowatt-hours compares with 2,170,750,000 in the preceding week.

Construction contracts awarded during April rose to an eight year peak, according to F. W. Dodge Corp., New York. Total construction in April, valued at $330,030,000, represents a gain of 49 per cent over the April, 1938, total and an increase of 10 per cent over the record for last March. A small decline in residential and non-residential building in April was more than offset by substantial gains in public works and utilities construction. Residential construction the first four months this year was considerably ahead of last year. The number of new dwelling units was 83 per cent greater than a year ago, and the dollar value was 73 per cent higher. Value of manufacturing building construction in the first four months this year increased $8,383,000, or 22 per cent over the corresponding 1938 period.

The National Machine Tool Builders' association's index of orders declined in April to 155.6 from 185.4 recorded during March. This represents the first setback registered by the index since last November. Despite the decline in the monthly index for April, the three month moving average index recorded a slight increase to 169.4 from 167.8 reported in March. The falling off in orders during April is a normal seasonal development and reflected declines in both domestic and foreign business.

Where Business Stands

Monthly Averages, 1938=100

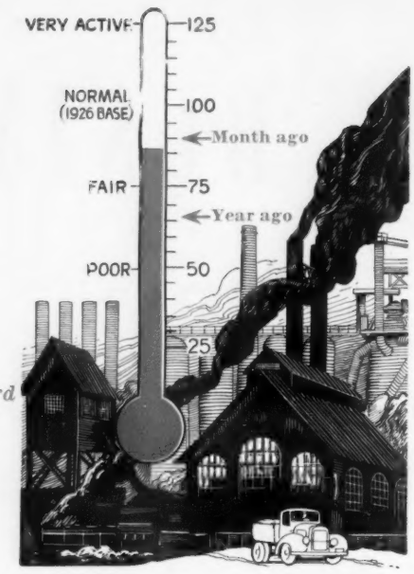
	Apr., 1939	Mar., 1939	Apr., 1938
Steel Ingot Output	132.1	137.8	82.0
Pig Iron Output	132.9	149.1	89.4
Freight Movement	97.1	104.1	92.6
Automobile Production	159.1	172.6	107.6
Building Construction	123.9	112.9	83.3
Wholesale Prices	*96.7	97.6	100.1

*Preliminary.

Industrial Weather

TREND:

Downward



The Barometer of Business

Industrial Indicators

	April, 1939	March, 1939	April, 1938
Pig iron output (daily average, tons)	68,793	77,201	46,267
Machine tool index (3 mo. ave.)	169.4	167.8	91.0
Foundry equipment new order index	146.0	146.6	79.3
Finished steel shipments	701,459	767,910	501,972
Ingot output (daily average, tons)	119,479	124,625	74,045
Nat'l Ind. Conf. board inventory indices:†			
Raw materials	99.0	100.6	114.4
Semifinished goods	113.6	112.3	120.6
Finished goods	110.1	109.5	116.5
Dodge building awards in 37 states (valuation)	$330,030,000	$300,661,000	$222,016,000
Automotive output	354,263	389,489	238,133
Coal output (tons)	10,747,000	35,290,000	22,380,000
Business failures; number	1,140	1,123	1,172
Business failures; liabilities	$17,492,000	$17,915,000	$20,106,000
Nat'l Ind. Conf. board (25 industries, factory):			
Av. wkly. hrs. per worker	†36.9	36.8	33.3
Av. weekly earnings	†$26.25	$26.11	$23.63
Cement production (bbls.)		8,171,000	7,983,000
Cotton consumption (bales)	546,702	649,237	413,169
Car loadings (weekly av.)	557,002	597,603	531,604

†March, February and March, respectively.

Foreign Trade

	April, 1939	March, 1939	April, 1938
Exports		$268,364,000	$274,482,000
Imports		$190,416,000	$159,907,000
Gold exports		$52,000	$13,000
Gold imports		$365,436,000	$215,825,000

Financial Indicators

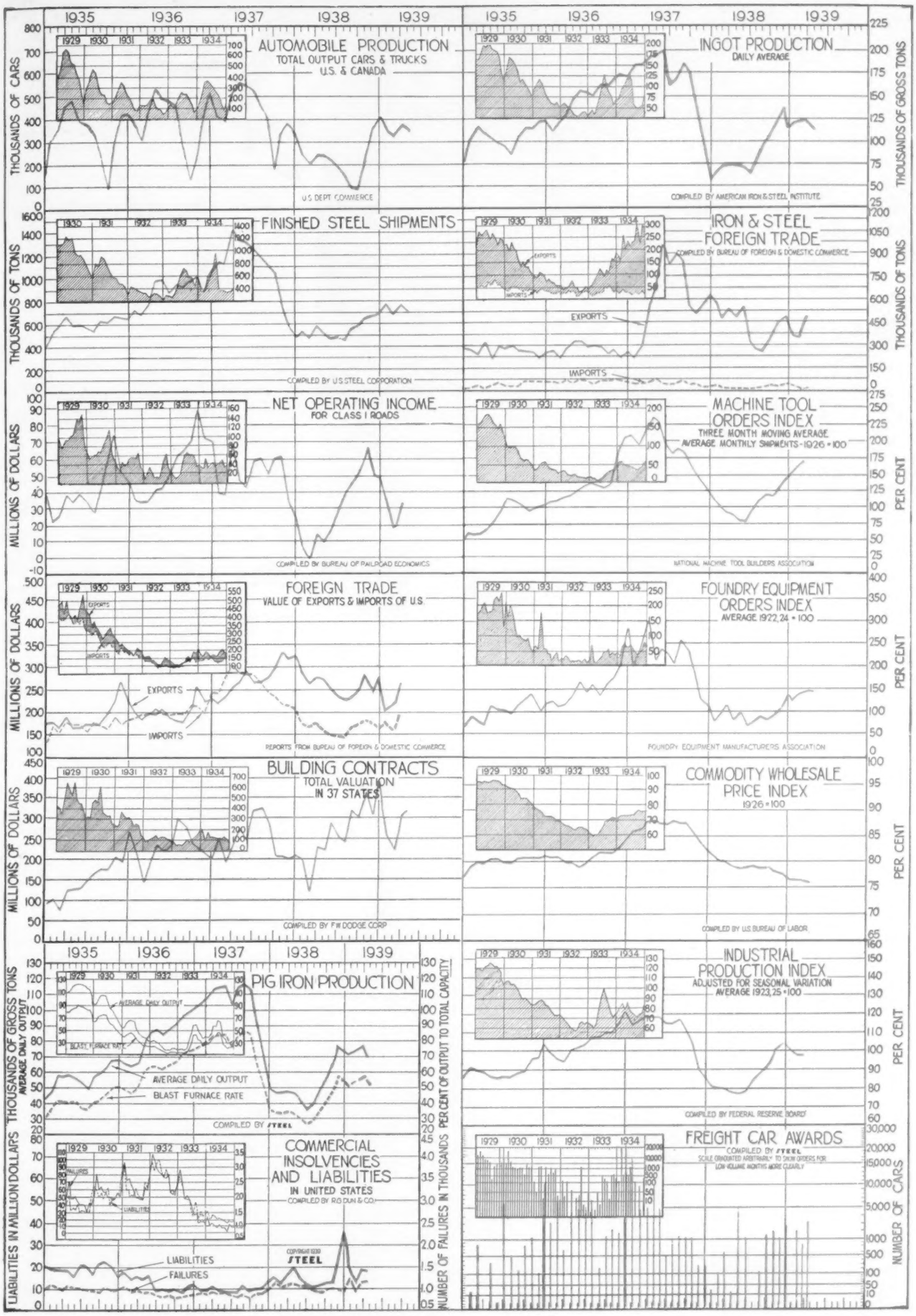
	April, 1939	March, 1939	April, 1938
25 Industrial stocks	$161.51	$178.01	$146.70
25 Rail stocks	$19.41	$23.18	$17.13
40 Bonds	$70.16	$72.72	$65.45
Bank clear'gs (000 omitted)	†$24,995,000	$19,711,000	$22,822,000
Commercial paper rate, New York (per cent)	½–⅝	½–⅝	1
*Com'l loans (000 omitted)	$8,100,000	$8,191,000	$8,587,000
Federal Reserve ratio (per cent)	85.1	84.7	82.5
Capital flotations:			
New capital	$142,621,000	$162,258,000	$196,483,000
Refunding	$213,320,000	$77,658,000	$155,729,000
Federal gross debt (millions of dollars)	$40,064	$39 985	$37,513
Railroad earnings	†$34,316,888	$18,590,734	$14,728,275
Stock sales, New York stock exchange	20,247,438	24,565,054	17,119,534
Bond sales, par value	$122,651,425	$185,855,800	$138,457,350

*Leading member banks Federal Reserve System.
†March, February and March, respectively.

Commodity Prices

	April, 1939	March, 1939	April, 1938
STEEL'S composite average of 25 iron and steel prices	$36.34	$36.40	$38.61
U. S. Bureau of Labor's index	*76.0	76.7	78.7
Wheat, cash (bushel)	$0.90	$0.87	$0.98
Corn, cash (bushel)	$0.64	$0.63	$0.73

*Preliminary.


1935 1936 1937 1938 1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS
U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
PIG IRON PRODUCTION
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Surface

By GUY HUBBARD
Machine Tool Editor

Bearing surfaces of this 3-ton heading slide are being precision ground to final finish on Mattison 24 x 96-inch surface grinder. Twenty-two-inch diameter wheel removes approximately .015-inch of metal. Clearance between wheel and table is 30 inches

■ When surface grinding is mentioned, the immediate reaction is apt to be either that precision work of small size, such as vertical forming tools, or relatively coarse work of large size, gear guards for instance, are what the speaker has in mind. Unless one lately has been getting around among leading machinery builders, or has been at the "receiving end" of vigorous sales efforts now being made by some of the machine tool builders, it may be somewhat difficult to conceive of surface grinding as a fast, economical and at the same time exceedingly accurate method for roughing and finishing machinery parts running up to several tons in weight.

Method Is Recognized

Nevertheless, it is true that surface grinding as a recognized method of heavy machining, definitely has arrived. Any production man who fails to recognize this is not keeping up with the times as far as machine shop practice is concerned.

Several factors have contributed to the development of the large, high powered precision surface grinder as a production tool on large work. I personally am inclined to place first, the imagination and courage of machine tool builders who dared to break with traditions which had bound the surface grinding process to the tool room. To do this they had—among other things—to overcome the widely prevalent but false idea that cast iron surfaces, when finished by grinding become charged with abrasive particles and forever after act as laps to any other surface with which they came into sliding contact.

Second, I would place manufacturers of grinding wheels. Through their work on abrasives, bonding and wheel design there have been developed many types of heavy duty wheels which are free cutting, safe and surprisingly long lived under heavy duty conditions. Without them the best heavy duty surface grinder would be practically useless on production work.

Third, I would mention the electrical industry because it has cooperated with the machine tool industry to make possible the powerful, smooth running direct motor driven wheel spindles which play such an important role in the performance of many modern large surface grinders.

To some who are without practical experience it may appear that removal of metal by grinding should not demand in a machine tool the degree of power and rigidity commonly associated for instance with heavy duty planning and production milling. As one non-technical observer of a grinding operation at the 1935 National Machine Tool Show expressed it,". . . the wheel apparently brushes away the solid metal as a revolving brush whisks away dust." As a matter of fact nothing could be further from the truth than that.

Success in heavy duty grinding came only when machine designers awoke to the fact that here—more perhaps than in any other type of machine—they must use plenty of well placed metal in beds, frames and slides to insure rigidity and to kill any unavoidable chatter or vibration; that they must design wheel heads with generous power provisions as well as for high speed, vibrationless operation; and that they must get a strong, steady "push" behind the work tables.

Power and Rigidity Needed

In other words, the appearance of "brushing the metal away" is purely an illusion. What actually happens is that the metal is cut away in the form of chips (even though they are minute chips) by what amounts to a powerful, ultrahigh speed milling cutter having a tremendous number of very sharp and extremely hard cutting teeth. For this reason a successful heavy duty surface grinder—insofar as power and rigidity are concerned—is in the same class as high production bed-type milling machine or a modern openside planer. This is borne out by the illustrations which accompany this article.

Perhaps the most effective way to demonstrate the penetration of precision surface grinding into the field of heavy machining is to cite successful examples. Two such are

...e Grinding Has Arrived As a Method of Heavy Machining

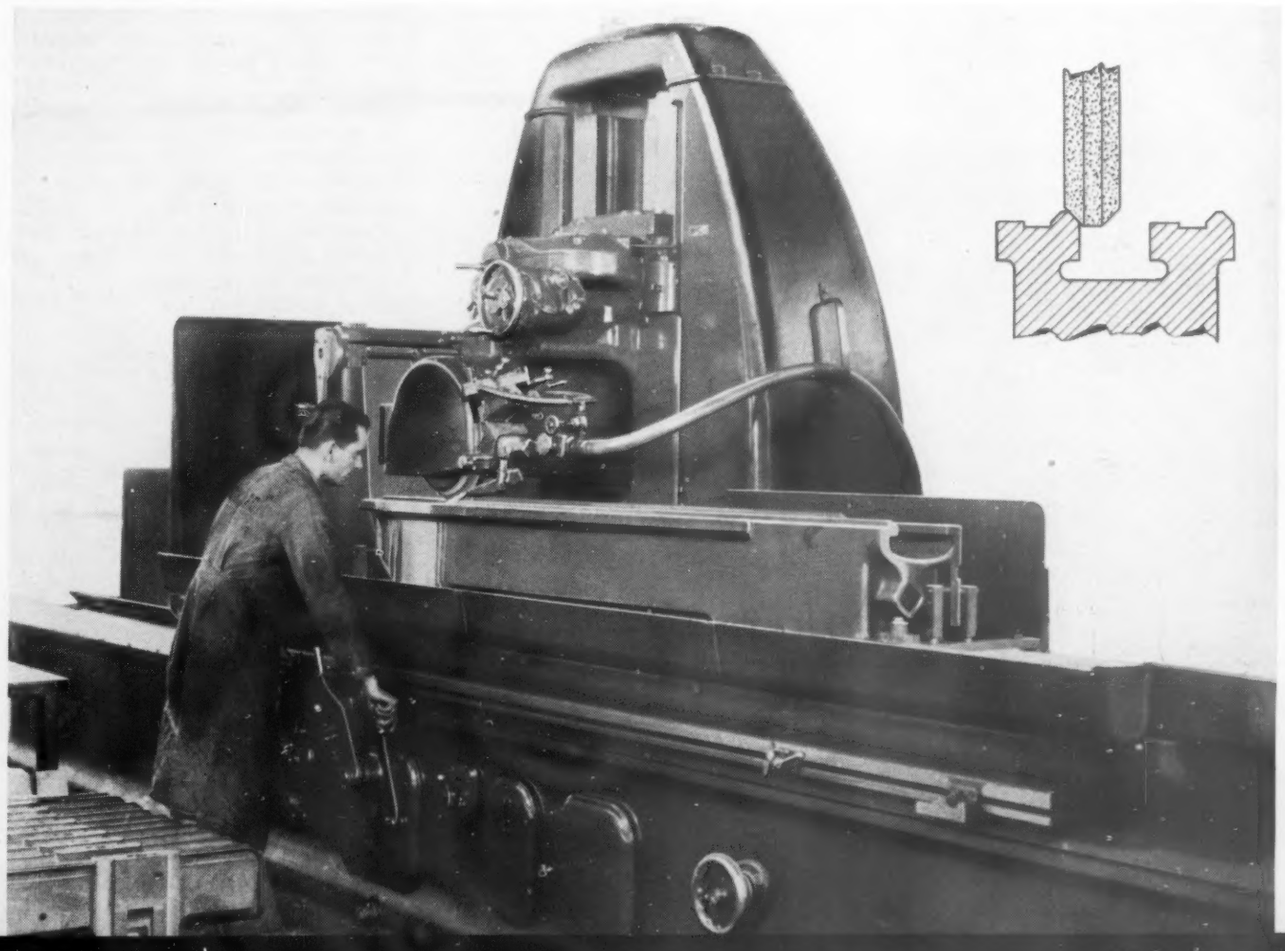
depicted herewith. The part shown in process in the upper left hand cut is the slide for a powerful heading machine. This massive casting weighs 3 tons. Formerly it required 16 hours of hand scraping to give its four working surfaces and their six edges required accuracy and finish. Through the use of a high powered precision surface grinder, this job is now performed in 6 hours, with no scraping required. This represents 62½ per cent saving in finishing time.

The cut at the lower righthand side of this spread is a good illustration of the fact that "machine tools are the machines which make machines—including themselves." Here we see a large precision grinding machine finishing the flame-hardened ways of a lathe bed. Both flats and V-surfaces are smoothly finished to extremely close limits at this setup—a special truing device being mounted on the wheel slide to permit dressing both sides of the wheel to the exact V-angles. In this case, comparisons are hardly possible because the hardness of the bed surfaces makes this the only practical finishing method.

In another case, not illustrated, a cast iron slide used in a broaching machine has five plane surfaces which must be finished exactly parallel and extremely smooth. When machined and hand scraped it required between 12 and 14 hours to finish one of the slides. This was cut to 1½ hours floor to floor time per piece through use of a surface grinder equipped with a 12-inch x 48-inch magnetic chuck.

If space permitted, numerous other examples could be mentioned, where time has been cut anywhere from 50 to 80 per cent, on parts of many materials and shapes.

Finishing flat and V-ways of flame-hardened lathe bed—high powered precision surface grinder in this case having 24 x 144-inch table and clearing 30 inches under wheel. Special device mounted on wheel head dresses wheel to exact angles



New Plant for Cemented

One of the continuous presses forming specially shaped pieces from carbide powder

Impressive from standpoint of ample room, light and air conditioning, new plant embodies latest methods of making cemented carbide products. It combines facilities at three former locations

■ ON June 1, Carboloy Co. Inc. will formally open its plant and general offices in Detroit for the manufacture of cemented carbide products. This new plant, largest cemented carbide plant in the United States, embraces a total area of 121,750 square feet. All manufacturing facilities formerly divided among Carboloy plants in Cleveland, Detroit and Stamford, Conn., are combined in this new location.

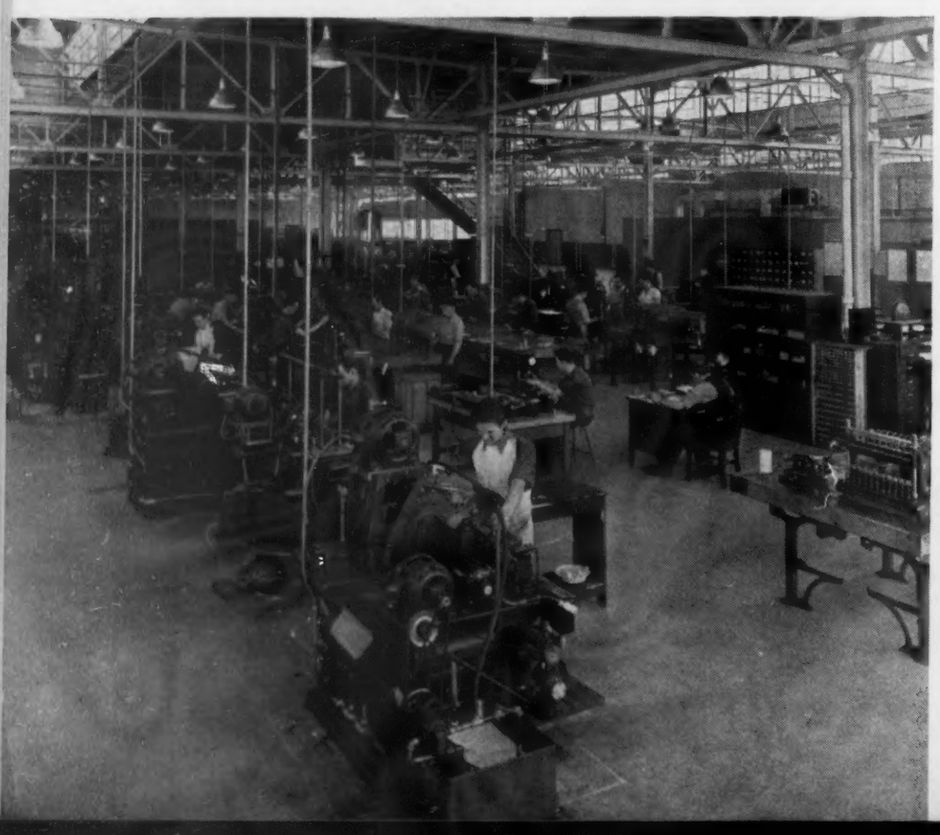
Designed throughout for the quantity production of cemented carbides, the unusually extensive facilities of the plant are indicative of the anticipated trend of cemented carbide use. Equipment now installed and planned for the immediate future is said to be capable of producing approximately ten times the present amount of Carboloy currently consumed by industry. Supplementary reserve space provides for expansion considerably beyond this known potential capacity.

The plant is located on a 40-acre site on East 8-Mile road, just beyond the city limits of Detroit. A two-story administration building, with an area of 35,556 square feet, houses all general office departments such as sales, engineering, drafting, purchasing, accounting, etc. This structure is of reinforced concrete, fireproof construction, completely air-conditioned, with acoustical ceiling in halls and offices.

Of particular interest to management executives are the unusual lighting facilities provided in this building. Departing somewhat from conventional lighting methods, all illumination emanates indirectly from ceiling coffers 4 feet square by 15 inches deep. These provide from 25 to 40 foot-candles at the working plane.

A distinctive lighting effect also is achieved in the lobby and display room through the use of the new fluorescent mazda tubes.

Even greater light intensity is provided in the plant itself, some departments having up to 50 foot-candles at the working plane. The plant, connected with the rear of the administration building, is a monitor-type, one story, all welded, steel and brick frame structure, covering an area of 88,197 square feet. It contains complete facilities for the manufacture of Carboloy from the raw materials through to the finished tools, dies and wear resistant parts. Employment at present is around 450.



Die, grinding and milling section. Note all-welded steel building frame

Research Laboratories

To control production, as well as for purposes of product development a completely equipped research

Carbide Manufacture

Night view of the entrance to the new $750,000 Carboloy general offices and plant in Detroit

laboratory is provided. This provides for numerous functions such as particle counts of the powdered metal under magnifications as high as 3000 diameters, microscopic structure analyses of hardened Carboloy bars, chemical analyses, hardness, density and transverse rupture strength tests, special process and equipment development.

The importance of these laboratories is apparent from the fact that approximately 12 tests are conducted at various stages of production during the processing of each new "batch" of Carboloy. Maintenance of a sample file in which 500,000 grams of the material, permanently identified for recheck purposes, has been accumulated to date, indicates the unusual precautions taken to control the processing.

Powder-Metal Department

The powder-metal department, or "metal room," as it is called, is reached through air locks, installed to insure uniform operation of the air-conditioning system which closely controls atmospheric conditions in this section. Constant temperature (80 degrees Fahr.) and humidity levels (37 per cent) are maintained here for accurate weighing and blending of the powdered metals, inasmuch as some of the materials are hygroscopic.

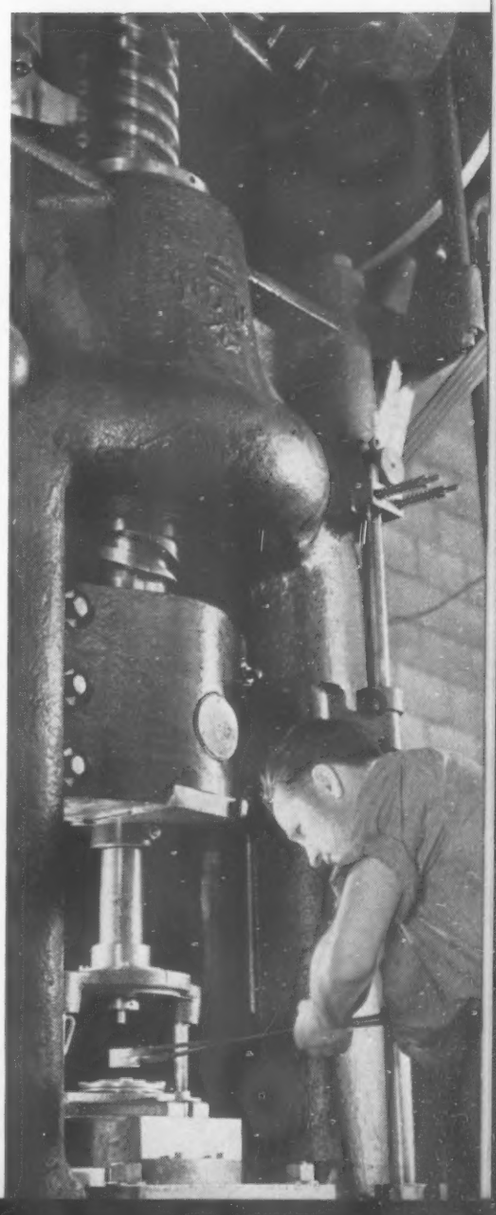
Extreme cleanliness also is essential to prevent contamination of the powdered metals. Equipment in this department includes ball mills, crushers, sifting and mixing units. The recently introduced, 100-watt Cooper-Hewitt fluorescent tubes made especially for production precision operations, are used to illuminate this department. These provide 40 to 50 foot-candles at the working plane, and because of their relative "coldness" have little effect on room temperatures.

Metal Presses

After the initial powdered metal processing, the powdered metals are received in the press room, which is in a connecting wing of the "metal room."

Two 300-ton presses provide for the production of ingots with maximum rectangular dimensions: Length 18 inches, width 2 inches, depth 1½ inches. Two supplementary continuous presses forecast the unusual quantity production economies that will become possible as standardization of grades, shapes, and sizes progresses. These presses —with a capacity of several hundred pieces per hour—press individual pieces requiring no additional forming operations. Storage bins in this department have a capacity of 50,000,000 grams of raw and processed cemented carbide powders.

Quantity production on all operations requiring a heating cycle is provided for by the installation of 18 furnaces for reduction, carburizing, semi-sintering, sintering and brazing processes. Supplementing these,



Hot forging steel casing around the Carboloy die nib in a wire drawing die

A "boat" of pressed Carboloy rings entering the electric furnace for the semisintering process

several additional furnaces are maintained in other departments for brazing of tools and hot forging of die cases. Quantity handling is amply provided for in many of the furnaces through such features as stoking units for semicontinuous operations, controlled heating and cooling cycles, etc.

Control panels adjoining the furnaces contain temperature recording control instruments, and individual hydrogen control meters for each furnace.

Hydrogen Facilities

Hydrogen is used for all processes requiring a nonoxidizing atmosphere in the processing furnaces. Indicative of the precautions taken to maintain the desired standard of quality and uniformity, is the installation of special equipment to produce hydrogen with a high degree of purification and dryness. Two generating units with 40 cells have a total capacity of 1250 cubic feet per hour. Storage is provided in a 40-foot spherical tank of Hortonsphere which can hold approximately 100,000 cubic feet at 15 pounds pressure.

Milling machines, grinders, lathes, cut-off equipment and specially designed radius machines, shaped die forming equipment and the like are employed in this department to form the rough semisintered ingots and special blanks into the shape desired. A wide variety of blanks, ranging from extremely thin, delicate parts to large die nibs several inches in diameter are turned out shaped and sized close to the finished dimensions.

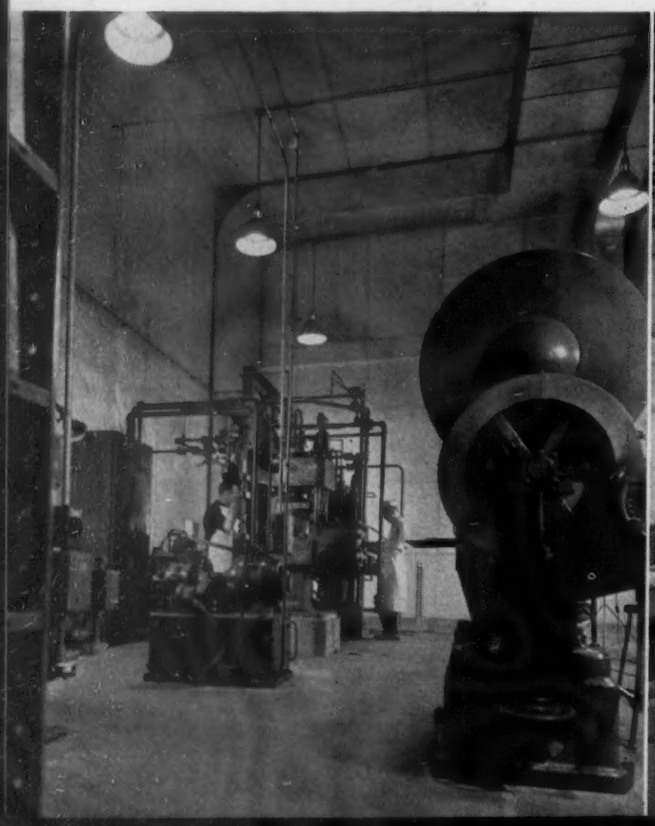
Milling Department

While the Carboloy blank is being processed, the steel shank in which it will be brazed is being prepared in the milling department. Here, stock is cut to length, and recessed to accommodate the carbide insert. Multiple spindle milling machines, hydromatic milling machines, universal backing off lathes, screw machines, shapers and other equipment provide ample facilities for both quantity production and special production orders.

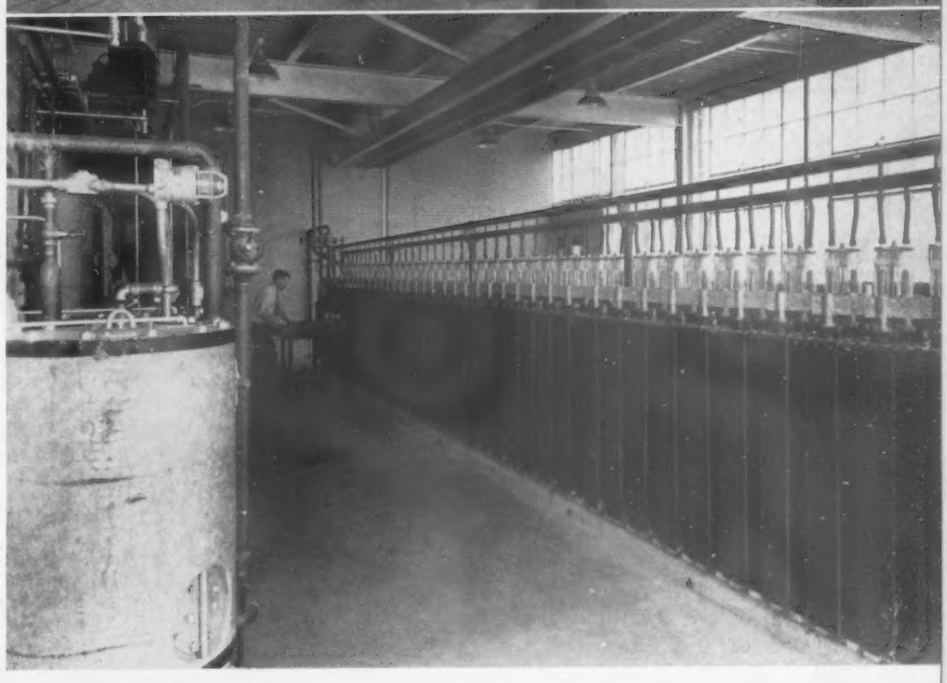
Batteries of hydraulic surface grinders, universal internal and ex-

Furnace room (right) equipped with battery of 18 electric furnaces for reduction, carbonizing, semisintering, sintering and brazing processes. Special overhead air filter prevents contamination of powdered metals

Two 300-ton presses (left) with capacity of several million grams of Carboloy monthly, provide for the production of ingots pressed from powdered metals. Two supplementary, continuous presses —with capacity of several hundred pieces per hour — press individual pieces requiring no additional forming operations



Milling department (top) where steel tools and cutters are prepared to accommodate the Carboloy insert prior to the brazing operation



(Bottom) Equipment for the production of hydrogen includes two generating units with 40 cells, and a total capacity of 1250 cubic feet per hour

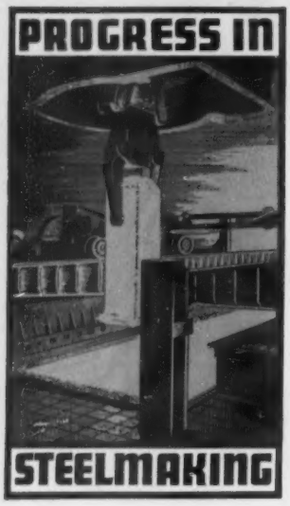
ternal grinders, special cutter grinders, diamond lapping machines, etc., receive the tools as they come from the brazing department and perform the final grinding operations necessary to produce a finished tool ready for use. Tolerances as close as 0.0001-inch are often required on this work.

At this point in the manufacturing process, Carboloy wire, bar and tubing dies are segregated from the production of tools and other products. Operations arranged for quantity production in this department include preparation of casing to receive the carbide nib, rough drilling, lapping and finishing of round hole dies. Adequate facilities are also maintained for sectional and shaped die manufacture. New, specially designed machinery is now installed for practically automatic operation in the production of shaped dies.

Of particular interest are the facilities for hot forging the die casings

(Please turn to Page 66)

(Below) Surface grinding a tool shank preparatory to milling the recess in which the tool tip will be brazed



Ingot Mold Insulation

New insulation of ceramic-coated cork reduces piping in killed steel ingots, permits repouring, eliminates carbon pickup and entrapping of metallic materials, gives higher yield per ton and per ingot, and affords better regulation of ingot size

By **FRED M. RITTS**
High Temperature Div.
Armstrong Cork Co.
Lancaster, Pa.

■ A NEW type of ingot mold insulation is attracting considerable attention. It consists of small pieces of cork, granular in form and coated with a ceramic material. The insulation weighs about 25 pounds per cubic foot. Usually the top of the mold is covered with about 4 inches of the material.

One of the most important advantages accompanying use of this material is a reduction in piping in killed steel ingots. Referring to the accompanying drawing, the two sketches show the type of piping obtained with ordinary hot top molds using coke breeze as insulation and the same type of mold using the new insulation developed by Armstrong Cork Co., Lancaster, Pa.

A number of tests in various plants show significant savings accompanying the use of this material. For instance, on a 9000-pound ingot of killed steel, 2 inches of this insulation kept the ingot molten for a total of 65 minutes as compared to 12 minutes when sand was used.

Good Rate of Feeding

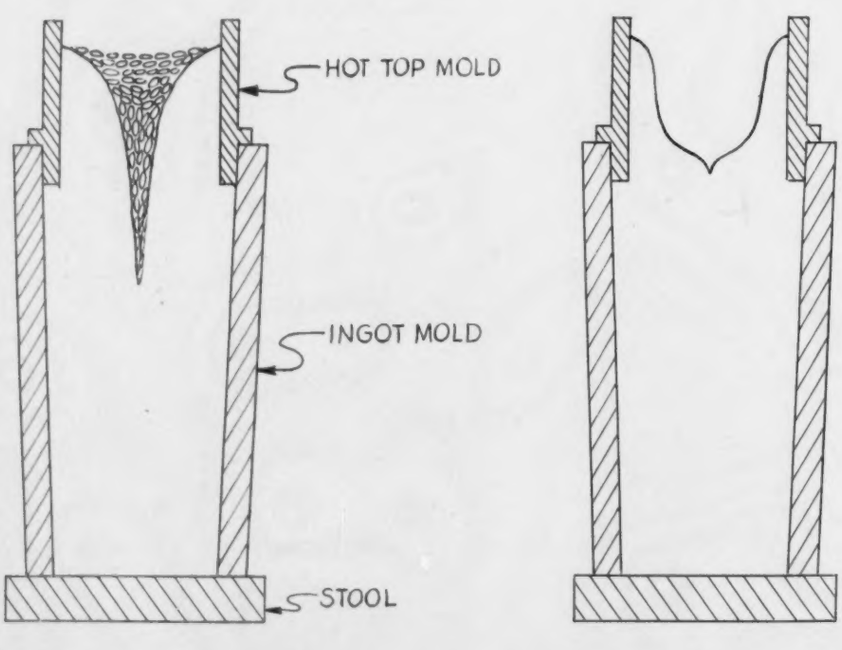
In making this test, the ingot was found to have solidified out only about 1 inch from the hot top edge at the end of the first half hour. At the end of 45 minutes, solidification had progressed to about 3 inches from the edge. After cooling for 65 minutes, solidification had progressed to about 5 inches from the edge. Center of ingot was still molten and a stick could be pushed easily through the insulation. At the end of 65 minutes, the test ingot had sunk about 3½ inches while regular ingot appeared substantially as when poured. This indicates a good rate of feeding for the new material.

One of the most important advantages of the new material is that it permits repouring. There are times when it is necessary to use more than one ladle of molten metal to complete the ingot. It requires about 45 minutes for an ingot approximating 2 tons to cool sufficiently to permit addition of sufficient hot metal to compensate for piping. It requires only about 30 minutes to pour a 100-ton ladle, which means that a certain portion of hot metal or a new ladle full must be retained to complete the pouring. Usual materials used on top of the ingot form a crust across the top very shortly after the first pouring. This makes additional pouring or repouring impossible. This is because the insulation value is usually so low that top of the ingot may bridge over sometimes as soon as 20 minutes after the initial pouring.

Piping is Reduced

By using this new insulating material in sufficient amount to form a layer 4 to 6 inches deep directly on top of the newly poured ingot, the top remains fluid for a period of at least 1 hour and 15 minutes on as small as a 4000-pound ingot. This, of course, results in reduced piping as illustrated in accompanying diagrams and also reduces amount of metal in the crop end,

(*Please turn to Page* 61)



These sketches show comparable reduction in piping in ordinary killed steel ingots. At left, coke breeze was used. At right, the new ceramic-coated cork insulation was employed

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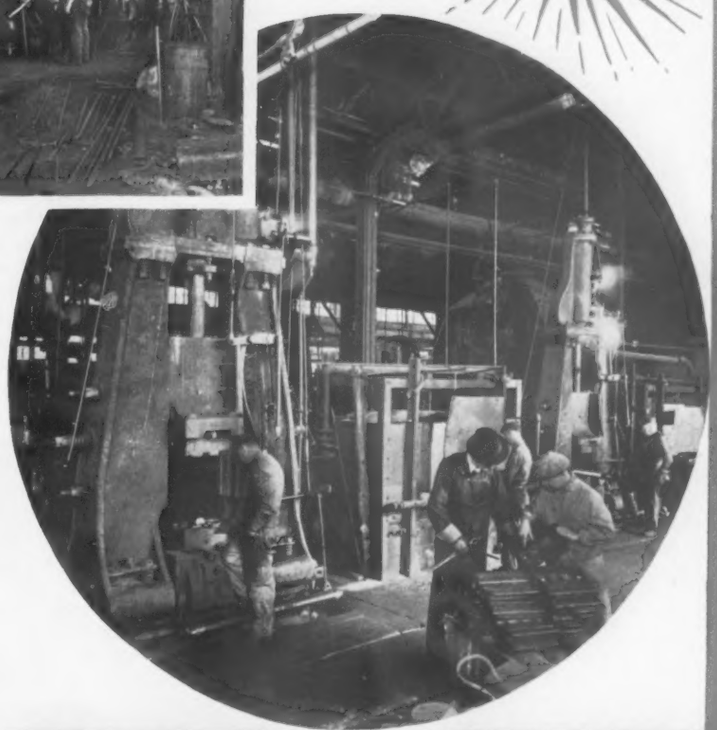

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Welding Fittings

New fittings cut time and metal required to make the weld. Pipe is quickly centered. Integral reinforcements give increased strength. Warping and remachining are eliminated. Socket fittings, use of centering lines aid in lining up

By E. HALL TAYLOR
Vice President
Taylor Forge & Pipe Works
Chicago

■ NEW DEVELOPMENTS in welding fittings have come so gradually that most users are not aware of type changes and improvements now available.

The new "Proposed Standard for Welding Fittings," available from American Society of Mechanical Engineers, New York, covers overall dimensions of fittings in elbow, tees, caps, reducers, return bends, and lap joint stub ends. It also covers the pressure ratings, size, marking, material, metal thickness, tolerance and the welding bevel.

With these standards established, engineering departments now can lay out pipe lines with the knowledge that the fittings of various manufacturers are being changed to conform to the new proposed dimensions.

Angle of bevel for butt welding has finally been agreed upon as 37½ degrees. This bevel has been in use in pipe line work for some time. As fast as changes can be made, the 37½ degree bevel will be adopted on welding fittings. The narrow groove formed by this bevel requires less weld metal, thus saving time and material.

Welding small diameter pipe always has presented a problem in lining up and in welding. Wall thickness of pipe, 2 inches diameter and under, is quite thin. When bevelled for welding, the narrow bevel is not easy to line up with the pipe, and welding the thin wall requires care to avoid burning through. The development of socket welding fittings several years ago solved these difficulties, but it has only been recently that they have come into widespread use. It is easy to center pipe in a socket fitting as the pipe slips into the end of the fitting for a short distance. A fillet weld is made between fitting and pipe. There is no danger of burning through as this weld is on the outside of the pipe. In many tests to destruction, the pipe has always failed before the fitting shows distress.

New developments in welding methods have steadily improved weld quality and have increased the speed of welding. This has done much to further the installation of welded piping systems. It is safe to say that the quality of welding today is such that the welded joint is equal to or stronger than the pipe itself. The same statement should hold true of welded fittings in order to give a full strength pipe line throughout. To accomplish this, the newer fittings are reinforced at points of greatest strain. Tests to destruction have been conducted on many fittings in which the seamless pipe has burst before the fitting, showing how well this reinforcing has strengthened the fitting against deformation.

Branch Connections Important

Reinforcing those branch connections attached to pipe by welding has assumed such importance that a committee has been formed by the American Standards Association to study this. Extensive tests are being run to determine just what the strains are and what reinforcement is necessary when a hole is cut in a pipe for a branch connection. It is not generally recognized how much a pipe is weakened when a hole is cut in it for a branch outlet. Modern welding tees are designed with reinforcement around the branch so strength of tee is

Abstracted from paper presented at International Acetylene association's convention in Houston, Tex., March 8-10.

Socket fittings make it easy to center the pipe in the fitting, prevent burning through the thin wall of pipes since a fillet weld is made on outside of pipe

approximately equal to yield point of the pipe, thus eliminating any weakness at the outlet connection.

Another rapidly growing development in use of welding fittings is the forming of expansion loops by their use. Expansion loops made of welding fittings are flexible and can easily be made to fit almost every expansion condition and requirement. Cutting pipe to length and attaching by means of welding fittings is all that is required to make a loop. As expansion is taken care of by varying the piping length, the elbow serves as a flexible pivot point and the expansion is absorbed by the flexing of the pipe. This is a simple, inexpensive and safe way to take care of expansion in a pipe line.

Warping Eliminated

In the past few years, the design of the hub on butt weld flanges has been so improved that there is no danger of welding heat warping the face of the flange. Warping has been encountered in some cases where slip-on flanges were used as the weld is so near the face of the flange that the heat has some effect upon it. In some instances it has been necessary to machine the face of the slip-on flange after welding. The use of butt-weld flanges eliminates any danger of warping and the need for remachining.

Welding is used today on practically every installation that requires high quality. However, there are many low-pressure installations where the user feels welding is too costly. Now new developments in welding fittings are lowering the cost of a welded installation. Often the largest part of cost of making a joint is in preparing, laying out, cutting, fitting and lining up to get ready to weld. These are the costs reduced by new developments in fittings.

The first step to reduce costs is to see that the welding operator gets the right fitting for the job. Shop men know how much time can be wasted looking up tickets and tags and checking dimension tables, trying to identify fittings from a stock pile full of various sizes and standards. To provide positive identification, the size and standard of each fitting now is stamped into the fitting along its side. Anyone without any knowledge of pipe standards can easily identify a fitting so stamped.

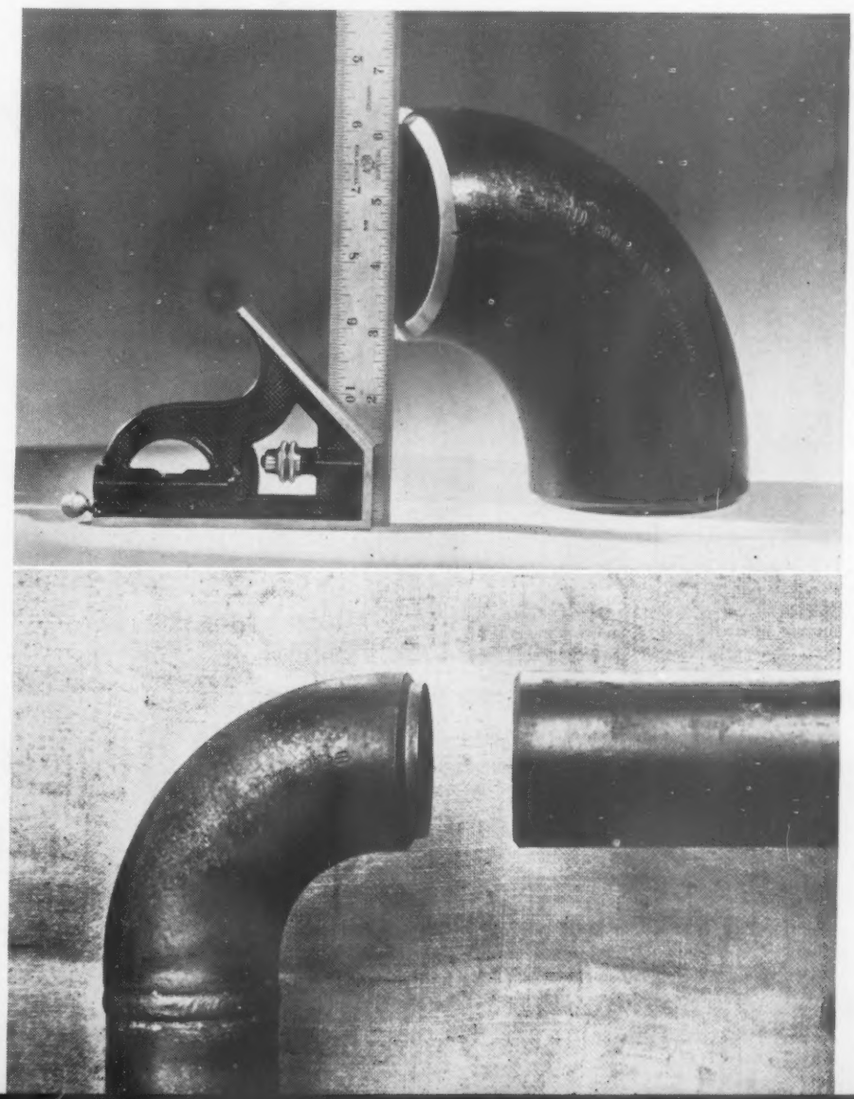
Given the right fitting, the next problem is to line it up. Fittings are machine beveled accurately so there is no problem in their joining evenly against the pipe end. The real time lost is in trying to determine the angle at which the fitting should be turned to fit the next run of piping. An angle cannot be measured without some reference point to start from so the center line of the fitting first must be determined. This takes time and is not the easiest thing to do on an irregular shaped object like an elbow. Hence, the new development of marking center lines on elbows is valuable. These center lines are machine marked for accuracy. With these as reference points, it is easy to determine any angle at which it is wished to place the elbow.

Lining up the welding fitting so it is concentric with the pipe end often is facilitated greatly by use of various jigs and clamps. An easy means of lining up, however, is not available in all cases. A new fitting which lines itself up now has been developed. It has a centering ring, forged integral with the fitting, to center the elbow into the pipe, thus assuring accurate alignment instantly without any leveling or shimming. This ring will support the pipe end, holding it in readiness for welding and so eliminates the need for extra support.

Ring Strengthens Weld

In addition to saving time in lining up, this ring has been found to improve the strength of the joint weld by assuring complete penetration. This centering lip acts as a backing-up ring as the operator can weld against this ring without fear of burning through. The weld thus extends clear down to the bottom of the bevel, which is not always the case in some butt welds. The ring also stops weld metal from flowing inside the pipe, thus preventing formation of projections or icicles to obstruct the flow. The ring is an integral part of the elbow, so there is no danger of its coming loose. It is so small and fits so snugly to the pipe that there is no measurable friction loss.

Developments in welding and in welding fittings have only begun. It is expected that they will develop so rapidly and show such quality and economy that soon all pipe lines, large and small, will be welded.



Upper, marking centering lines on the fittings at the factory now aids greatly in lining up work in the field. Small notches show horizontal and vertical center lines. Lower, centering fittings automatically center elbow in pipe, afford accurate alignment. Also act as back-up during welding. This prevents weld metal from flowing inside the pipe and permits complete penetration when making the weld

New Barrels From Old

Roller conveyor is synchronized with continuous automatic lowering unit to provide fast, efficient transportation of steel barrels and drums between various floor levels. Other handling operations also mechanized for maximum speed and efficiency

■ MANY OIL refineries have recently installed complete mechanical handling facilities for use in carrying returned oil barrels and drums through cleaning, repainting and refilling operations. These fast, highly efficient, effortless aids to efficient plant operation afford significant economies. A typical example is found in the plant of Champlin Refining Co., Enid, Okla.

Referring to the layout diagram shown in Fig. 1, barrels from the unloading area pass first to a machine which washes and rinses the inside of the drums. This machine consists of a platform on which the drum is placed with the end containing the bung at the bottom. A spray head extends through the opening up into the drum. This head is driven by an electric motor with gear reduction to revolve the spray inside the drum. A 3-way valve is used to control the operation of the spray head. In one position, a high-pressure hot caustic or similar solution is forced through the head. This thoroughly removes any grease or oil on the inside of the drum. Another position of the valve permits clean rinsing water to flow through the head under high pressure, thoroughly rinsing the inside of the tank.

This wash unit is located at point A, Fig. 1, and is on the outside of the small building which contains the beginning of the processing line.

In this small building is the equipment which washes the outside of the barrel. The drums pass from a cleaning tank onto a roller table where they are revolved under sprays which rinse the outside surfaces. Drums are loaded into the wash tank by hand. A mechanism clamps and revolves the drum in a bath of hot caustic under brushes at sides and ends. Drum is kicked out by operating a lever. Spraying is done automatically as the drums roll down the adjoining roller section. From this small building, the roller section extends to an area between the small and large buildings where a continuous hook-type elevator unit lifts the drums and discharges them at the second floor of the main building.

Drums are now clean and dry, ready for painting. Paint is applied

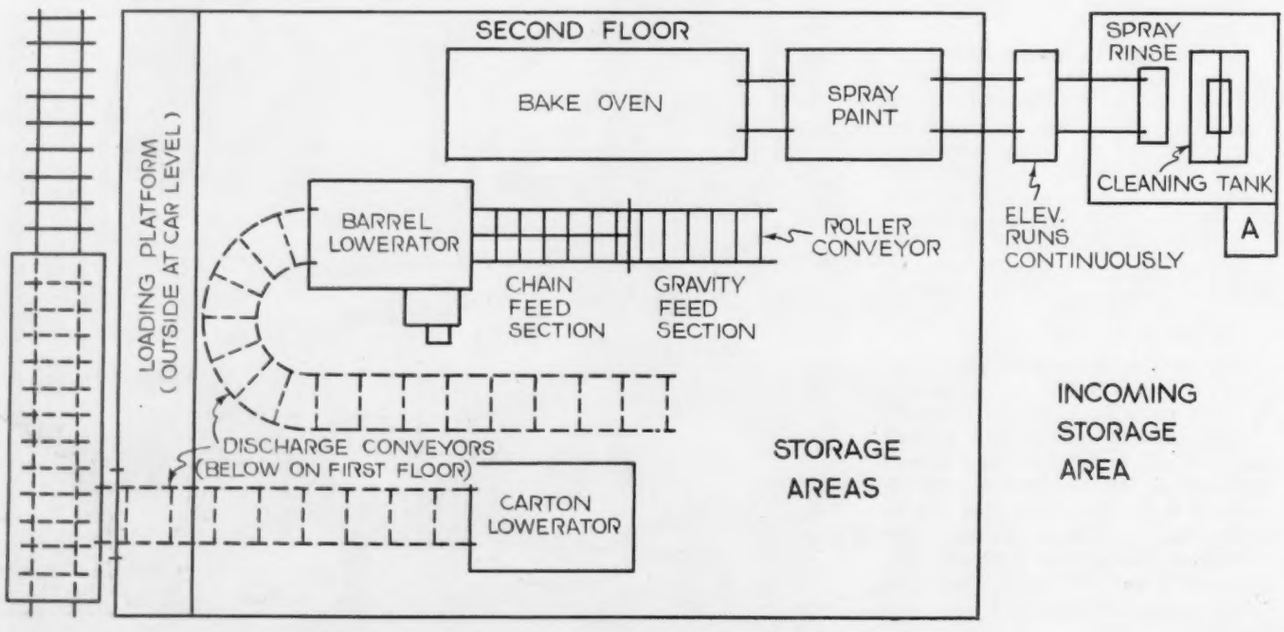
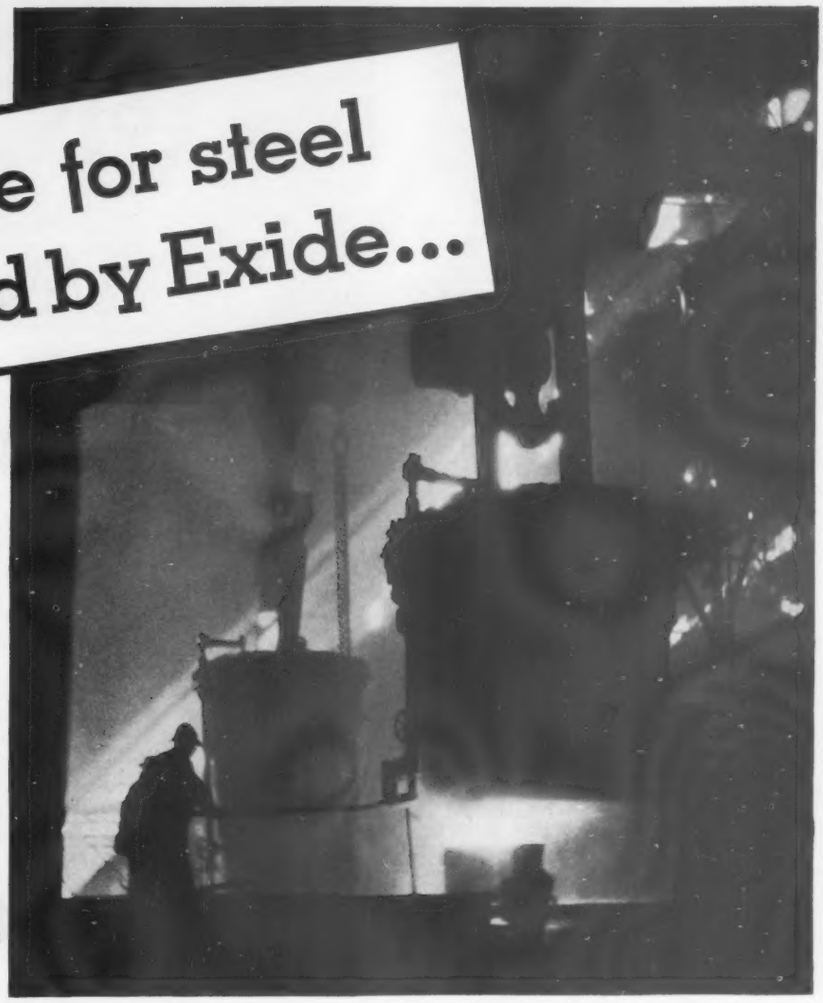


Fig. 1—Layout diagram of cleaning, painting and baking equipment with conveyors

A new use for steel developed by Exide...



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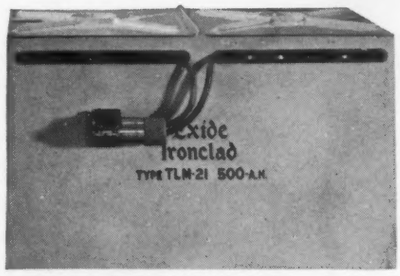
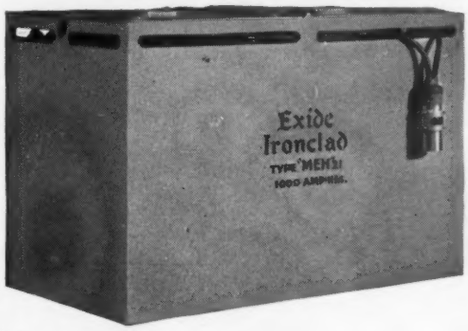




UNTIL now, wood has been used for the trays that hold the cells of all storage batteries manufactured for use in electric trucks, tractors and storage battery locomotives.

In keeping with progress, Exide has developed steel trays—a new use for steel that promises to run into substantial volume.

Steel has many advantages. By saving space, it permits the use of higher voltage and higher capacity batteries within the limited space of the battery compartments of industrial trucks. Steel eliminates the need for multiple trays, making it possible to assemble many cells in one strong steel tray properly insulated and painted.

The steel industry has been built by finding new uses for steel. Here is another—and an important one. Exide is proud to lead the way in presenting this new use to the steel industry.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

by hand spray guns with the drums revolving on rollers, the operator moving the spray gun back and forth to cover the surface. The continuous lift elevator discharges drums into the painting area at the rate of about two per minute. Drums are either painted immediately or placed in storage on the second floor for painting at a later time. Drums usually are painted at a rate of 80 to 100 per hour. Painted drums pass directly into a bake oven where the paint is dried.

From this unit the drums are placed on a section of gravity roller conveyor leading to a lowerator unit where the drums are taken down to the first floor. This unit has a capacity of 80 to 320 barrels per hour. The variation in speed is obtained with a Reeves variable speed transmission having a ratio between maximum and minimum speeds of 4 to 1.

The roller conveyor section, lowerator and drives are shown in Fig. 2. An interesting arrangement is incorporated in the lowerator feeder mechanism to synchronize feeding of barrels from the roller conveyor to the lowerator. The lowerator unit consists of two continuous chains passing over large sprocket wheels and carrying trays fastened between the chains at intervals along their length. These trays are pivoted so a barrel placed in the loading side of the machine is picked up by the fingers of the tray passing between roller sections. Tray then lifts the barrel from the roller conveyor, carries it to the downward moving sides of the chains, where it goes down to the first floor unloading station shown in Fig. 3.

Barrels are fed into the lowerator by a chain carrying dogs which engage barrels at correct intervals. Barrels placed on the gravity roller conveyor section move automatically against a bar section which holds the drum in place until a dog from the chain drive engages the drum head to feed it into the lowerator. The chain drive is synchronized with the lowerator drive so drums are fed in at correctly timed intervals. Thus both the chain section of the roller conveyor and the lowerator unit operate continuously and automatically.

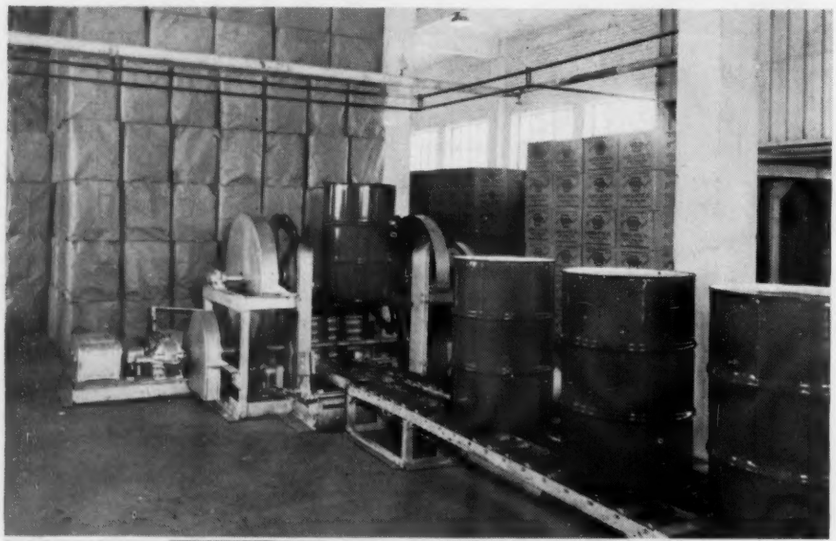
Barrels are stocked on the second floor so an ample supply is available at all times to the filling line on the first floor, which is served by the lowerator and gravity feed roller conveyor section shown in Fig. 3. As barrels come down the lowerator, fingers of the platform pass between sections of short rollers which permit a drum to start down the roller conveyor section.

On the first floor there is a filling line where the barrels and drums are filled with the required material, ready for shipment. Portable conveyor sections are employed in loading cars.

Fig. 4—Loading station of package lowerator unit. Photo courtesy Reeves Pulley Co., Columbus, Ind.

Fig. 2 (Upper)—Section of roller conveyor which automatically feeds lowerator unit

Fig. 3. (Lower)—Discharge end of lowerator unit on lower floor with roller conveyor carrying drums to storage or to filling station. Photos courtesy Reeves Pulley Co., Columbus, Ind.



Cartons Also Handled

In addition to handling barrels and drums, there are a large number of cartons to be handled in and out of the storeroom on the second floor. Fig. 4 is a view of the lowerator unit on the second floor employed in carrying these units to the unloading station shown in Fig. 5 on the first floor. This lowerator also is equipped with a variable speed transmission, giving it a wide range of operating speeds. Lowerator is constructed quite similarly to the barrel machine previously described.

At the first floor level portable roller conveyor sections are hooked up to the discharge end of this lowerator in such a manner that cartons are carried directly to doors of box cars on the adjoining railroad

(*Please turn to Page* 65)

A.S.T.M. To Round Out Year's Work In Atlantic City Annual Meeting

■ FORTY-SECOND annual meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30, will offer a well-balanced program with a considerable number of sessions devoted to metals, their specifications, testing and performance. Sessions will deal with iron, steel and nonferrous metals; ferroalloys; fatigue and corrosion; methods of testing; radiography, magnetic testing and metallography; and coal and gaseous fuels. Action will be taken on new standards and revisions to existing standards.

Of interest to those concerned with application of metals at low temperatures, in such fields as refining and railroads, will be a roundtable forum on "effect of subatmospheric temperature on properties of metals," sponsored by the joint committee on effect of temperature.

The fourteenth Edgar Marburg lecture will be delivered by H. F. Moore, professor of engineering materials, University of Illinois, Urbana, Ill. His subject is "Stress, Strain and Structural Damage."

This will be the first meeting in Atlantic City to be accompanied by an exhibit of testing apparatus and related equipment. Twenty-four manufacturers have engaged space to display their products. In addition, several society committees will sponsor exhibits directing attention to their work.

Tentative program for the meeting is as follows:

Tuesday, June 27

MORNING

Report of committee E-9 on research.
Report of committee E-10 on standards.
Annual report of executive committee, by C. L. Warwick, secretary-treasurer.
President's address, "Glimpses at Petroleum," by T. G. Delbridge.
Introduction of new officers.

AFTERNOON

Iron

Report of committee A-2 on wrought iron.
Report of committee A-3 on cast iron.
"Mechanical Properties of High-Strength Cast Iron," by Jasper O. Draffin and W. Leighton Collins, University of Illinois.
"Influence of Chromium on Oxidation Resistance of Cast Iron," by Charles O. Burgess, Union Carbide & Carbon Research Laboratories Inc.
Report of committee A-7 on malleable iron castings.
"Resistance of High-Silicon Malleable Iron to Drilling," by H. A. Schwartz, National Malleable & Steel Castings Co., R. C. Kasper and N. E. Mertz, Case School of Applied Science.
"Relation of Carbon Nodule Size and Tensile Properties of Malleable Cast Iron," by H. A. Schwartz, National Malleable & Steel Castings Co., H. J. Schindler and J. F. Elliott, Case School of Applied Science.
Report of sectional committee A-21 on specifications for cast-iron pipe and special castings.

EVENING

Water

Report of committee D-19 on water for industrial purposes.
Report of joint research committee on boiler feedwater studies.
"The pH, Dissolved Iron Concentration, and Solid Product Resulting from Reaction Between Iron and Pure Water at Room Temperature," by Richard C. Corey and Thomas J. Finnegan, Consolidated Edison Co. of New York Inc.

Roundtable Discussion of Effect of Subatmospheric Temperatures on Properties of Metals

"Sub-Size Charpy Relationships at Subzero Temperatures," by H. Habart and W. J. Herge, National Tube Co.
"Factors Affecting Notched-Bar Impact Tests of Steel at Low Temperatures," by Walter Crafts and John J. Egan, Union Carbide & Carbon Research Laboratories Inc.

Wednesday, June 28

MORNING

Fatigue, Corrosion

Report of research committee on fatigue of metals.
"Fatigue Tests of Wire," by C. P. Wampler, A. O. Smith Corp., and N. J. Alleman, University of Illinois.
"Fatigue Strength of Machined Forgings 6 to 7 Inches Diameter," by O. J. Horger and H. R. Neifert, Timken Roller Bearing Co.
"Fatigue Machines for Testing Structural Units," by R. L. Templin, Aluminum Co. of America.
Report of committee A-5 on corrosion of iron and steel.
Report of committee B-3 on corrosion of nonferrous metals and alloys.
"Chemical Removal of Corrosion Products in Determination of Corrosion Rate of Zinc," by E. A. Anderson and C. E. Reinhard, New Jersey Zinc Co.
"Atmospheric Corrosion of Nonferrous Metals and Alloys," by C. W. Borgmann, University of Colorado.
Report of joint committee on exposure tests of plating on nonferrous metals.

AFTERNOON

Coal, Gaseous Fuels

Report of committee D-5 on coal and coke.
Report of sectional committee M-20 on classification of coals.
Report of committee D-3 on gaseous fuels.

Marburg Lecture

"Stress, Strain and Structural Damage," by H. F. Moore, professor of engineering materials, University of Illinois.
Award of Dudley medal to Roy W. Carlson, Massachusetts Institute of Technology.

EVENING

Radiography, Magnetic Testing, Metallography

Report of committee E-4 on metallography.
"Application of Color Photography to Metallographic Work," by R. P. Loveland, Eastman Kodak Co.
Report of committee E-7 on radiographic testing.
"Use of Radiography in Development of Castings for Mass Production," by Don M. McCutcheon, Ford Motor Co.
"Factors Governing Practical Sensitivity of Radiographic Tests," by H. H. Lester, Watertown arsenal.
"Modern Testing of Aircraft Materials." "Correlation of Some Mechanical Tests of Aluminum Alloys with X-Ray Tests," by Tom A. Triplett, Triplett & Barton Inc., and W. Lavern Howland, California Institute of Technology; "Some Mechanical Tests of Aluminum Alloys 14ST and 24ST," by W. B. Mechling and S. S. Jack, California Institute of Technology.
Report of committee A-6 on magnetic properties.
"Magnetic Analysis — Modern Methods and Applications," by Theodor Zuschlag, Magnetic Analysis Corp.

Thursday, June 29

MORNING

Steel, Ferroalloys, Effect of Temperature

Report of committee A-1 on steel.
"The Work-Brittleness Test," by H. W. Graham, Jones & Laughlin Steel Corp.
Report of committee A-10 on iron-chromium, iron-chromium-nickel and related alloys.
"Alloy Casting Research Institute Test Block for Heat-Resisting Alloys; Its History, Selection and Utilization," by O. E. Harder, Battelle Memorial institute.
"Hastelloy Alloys, Their Physical and Corrosion-Resistant Properties," by F. G. McCurdy, Haynes Stellite Co.
Report of sectional committee B-36 on standardization of dimensions and materials of wrought iron and wrought steel pipe and tubing.
Report of committee A-9 on ferroalloys.
Report of joint research committee of A. S. M. E. and A. S. T. M. on effect of temperature on properties of metals.

EVENING

Methods of Testing

Report of committee E-1 on methods of testing.
"Tension Specimen Shape and Apparent Strength," by F. O. Anderegg, Owens-Corning Fiberglas, Royal Weller and B. Fried, Ohio State university.
"Rockwell Hardness of Cylindrical Specimens," by W. E. Ingerson, Bell Telephone Laboratories Inc.
"Analysis of Rockwell Hardness Data," by R. L. Peek Jr. and W. E. Ingerson, Bell Telephone Laboratories Inc.
"Stress-Strain-Time Characteristics of Materials," by Glenn Murphy, Iowa State college.
"A Study of the Influence of Speed on the Torsion Impact Test," by O. V. Greene and R. D. Stout, Carpenter Steel Co.
"Load Weighing and Load Indicating Systems, an Historical Account of Their Development with Particular Reference to Materials Testing Devices," by Chester H. Gibbons, Baldwin-Southwark Corp.
"Photoelastic Analysis of a Prestressed Beam," by F. O. Anderegg, Owens-Corning Fiberglas, Royal Weller and B. Fried, Ohio State university.

Friday, June 30

AFTERNOON

Nonferrous Metals

Report of committee B-1 on copper and copper alloy wires for electrical conductors.
Report of committee B-2 on nonferrous metals and alloys.
Report of committee B-5 on copper and copper alloys, cast and wrought.
"Nomenclature and Classification of Cast Copper and Copper-Base Alloys," by

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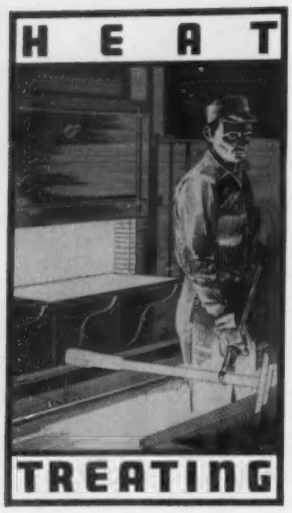


Oil Well Pumps

Pilot treatment of sample bars permits determining exact procedure and temperatures needed to produce best combination of physical properties in the material. Extremely rigid service requirements strongly emphasize quality. Alloy steels give increased usefulness to product

■ EQUIPMENT for pumping oil wells can be divided into two sections, the sucker rods and the pump proper. Sucker rods are the means of transmitting reciprocal motion from the pumping power at the surface to the pump at the bottom of the well, a distance usually of several thousand feet. The pump is the mechanism that lifts the oil to the surface.

Sucker rods are usually 25 or 30 feet long, with diameters varying from ⅝ to 1 inch. The ends are upset by forging to form a square shoulder and pin to facilitate connection and to strengthen the rod at the connection point, Fig. 1. In the Axelson rod, the upset is formed with a long, sloping shoulder to minimize stress concentration.

The rods are made from two analyses of nickel-molybdenum steel, designated here as A and B. The choice between them, as far as service is concerned, lies in the fact that analysis B has better corrosion resistance. The analyses are held to extremely close limits since it has been found that variations affect the serviceability of the rods. The specified analyses are given in Table I.

After forging and straightening, the rods are given a heat treatment consisting of normalizing at from 1550 to 1650 degrees Fahr. and drawing at from 1050 to 1225 degrees Fahr. This operation is performed in a specially designed furnace, Fig. 2. The exact normalizing and drawing temperatures for individual lots of rods are determined by what is known as pilot treating. Sample bars from each heat are heat treated. Sample bars from each heat are heat treated at various temperatures and then tested. The temperatures giving the combination of physical properties meeting the specifications are used in treating the rods of that lot.

TABLE I

	"A"	"B"
Carbon	0.20%	0.13%
Manganese	0.80	0.80
Phosphorus, max.	0.03	0.03
Sulphur, max.	0.03	0.03
Silicon	0.25	0.25
Nickel	1.80	3.50
Molybdenum	0.30	0.30

This care in heat treatment produces an excellent combination of physical properties in proper balance with chemical characteristics in the finished rod. The yield-tensile point ratio is in the neighborhood of 80 per cent. Ductility and impact strength are both high. The rods have excellent fatigue strength, which is not greatly affected by "notch effect." Both corrosion resistance and corrosion fatigue strength are exceptionally good. All of these properties are of vital importance to the serviceability of the rods.

Minimum physical properties specified for the rods are given in Table II.

After heat treatment, the rods are cleaned and inspected for defects, such as rolling or forging seems or cracks. Defective rods are re-

Abstracted from *The Moly Matrix*, published by Climax Molybdenum Co., New York.

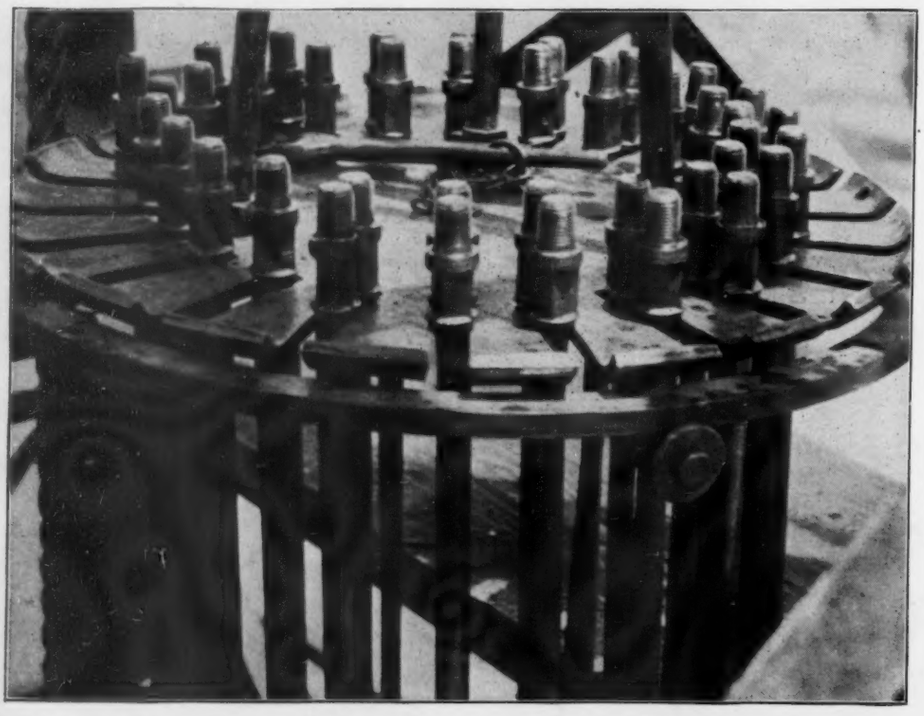
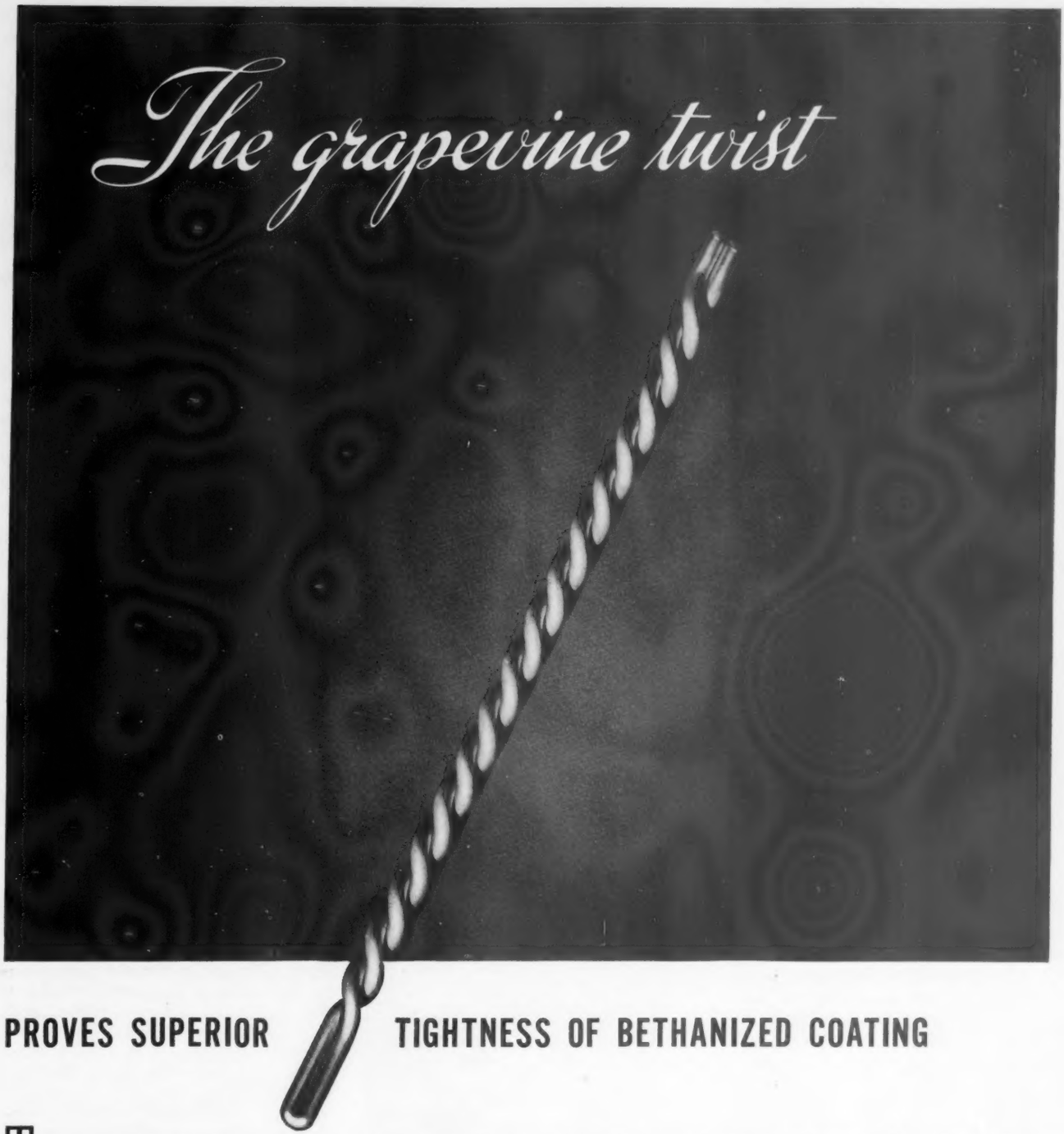


Fig. 1—Close up of sucker rods, showing square shoulders and pins



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jected, while those that have become bent or kinked, but are otherwise perfect, are put through a straightening machine. Rods thus straightened are given a supplementary normalize to relieve any possible strains. Machining, which consists of threading the pins, is done after heat treating. After final inspection and assembly of couplings the rods are ready for service.

TABLE II

	"A"	"B"
Tensile Strength, p.s.i.	85,000	85,000
Yield Point, p.s.i.	70,000	70,000
Elongation in 8", %	19	19
Proportional Elongation, %	29	30
Reduction of Area, %	65	67
Hardness, Brinell	166	166
Izod Impact, ft. lb.	90	100

Sucker rod couplings are made from carburized nickel-molybdenum (SAE 4615) steel. The coupling is a short threaded sleeve used to join the sucker rods together when they are made up into a pumping string. Since the couplings rub in the tubing, they are carburized to give them extra wear resistance. Case depth is 1/16-inch and the case hardness is specified at 60 to 65 Rockwell C. After being carburized, the couplings are drawn at 350 degrees Fahr. to insure requisite toughness in the core. Then they are ground and finish machined. The same close process controls are observed with couplings as with sucker rods, in order to maintain quality at the highest degree.

The conditions under which sucker rods work are bad, but those that pumps are expected to endure are worse in some respects. They are subject to loads of much the same character and to the same corrosive agents. In addition, they are subject to the abrasive action of fluid-borne sand to a greater degree than are sucker rods.

There are manufacturing problems involved that do not arise in the case of sucker rods. Parts are finished to extremely close tolerances which must be maintained in service. Parts such as liners and plungers are, in reality, cylinders of quite thin section. Any noticeable distortion would make them unfit for use.

The two problems, physical and production, resolve themselves into one of selecting a steel that will carry the loads imposed and resist corrosion; take an extremely hard, wear resisting case; and develop only minimum distortion as a result of heat treatment. It has been solved by the use of carburized nickel-molybdenum steel.

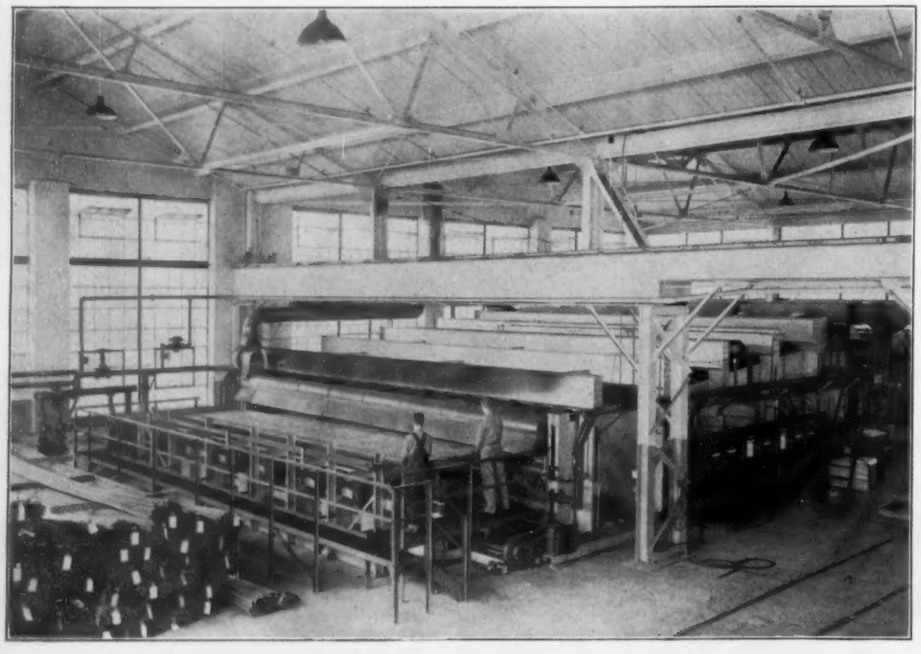
Parts Case Hardened

Cages, liners and plungers are among the more prominent parts made from SAE 4615. Balls act as valves in these pumps. Cages hold the balls in place during operation. Heavy duty cages made from SAE 4615 are carburized to give a case hardness of 60 to 65 Rockwell C and subsequently treated to give a core hardness of 300 brinell. It has been found that the treatment gives the guides of the cages sufficient hardness to prevent pounding out and sufficient toughness to prevent breakage.

Liners and plungers are case hardened to between 58 and 63 Rockwell C. No trouble is experienced from distortion during heat treatment because the molybdenum content of the steel causes the parts to harden uniformly without resorting to drastic quenching. Experience indicates these parts have superior resistance to abrasive action of fluid-borne sand.

Careful selection of steel and close control of manufacturing processes produced pumps that have made remarkable service records. In one case, such an alloy steel pump would be still going strong after 612 days of service under conditions that had ruined its predecessor in 150 days. In another case, an operator was forced to take out a pump made of unalloyed steel after 360 days. An alloy steel pump in the same well was still running after 888 days. Experience shows operators can expect anywhere from three to ten times the service, depending on conditions, from such pumps with parts made of nickel-molybdenum steel.

Fig. 2—Special furnace used for normalizing sucker rods



French Foundry Terms In Eight Languages

■ *Dictionnaire International De Fonderie,* (International Foundry Dictionary) edited by L'Association Technique de Fonderie, Paris; cloth; 334 pages; 3½ x 5½ inches; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W.1.

This international dictionary of foundry terms, in preparation for several years and issued by the Foundry Technical association, Paris, France, gives the definition in the French language of about 800 words and technical terms used in the foundry. In addition it has alphabetical indexes in French, German, English, Spanish, Italian, Polish, Portuguese, and Czechoslovakian. Independent of the commission especially appointed for the work, a number of engineers and technicians, specialists in the foundry and instructors in foundry trade schools, collaborated.

In the present edition the French word is preceded by a registration number followed by the French definition. The registration number distinguishes the word in all languages and permits finding an approximate translation in one of the indexes. French words are classified alphabetically and are preceded by their registration number in one section. In a second section the words are followed by the numerical index. The same method is used in the presentation of terms in the various foreign languages.

Better Melting Practices Improve Steel Castings

■ MISCELLANEOUS methods of melting were discussed at a symposium on steel melting practice, which constituted one of three sessions arranged by the steel division. Six papers were contributed in the symposium.

Dealing with the converter method of steelmaking, F. B. Skeates, foundry superintendent, Link-Belt Co., Chicago, recalled how side-blown converters went into disrepute during the World war because of high melting costs and high sulphur content, and how the desulphurizing process returned them to favor.

He suggested that manganese in the metal from the cupola should not be too high, inasmuch as a high percentage of this element gives a wet, sloppy blow and tends to corrode the vessel lining. He also stressed importance of holding the converter to size and having tuyeres at proper height from the bottom. Another important point is that the receiving ladle at the cupola and recarburizing ladle should be held to size by using a form for lining, or by weighing metal going into the converter.

A typical furnace, losses, metal temperature, melting practice and furnace performance, were considered by G. F. Landgraf, Lebanon Steel Foundry, Lebanon, Pa., in discussing induction furnace practice. The speaker mentioned five advantages of this type of furnace as including flexibility as to types of alloys that can be produced in successive orders, low melting losses, accuracy of analysis control, ease of temperature control, and a high degree of uniformity of product.

Uniformly High Quality

Mr. Landgraf does not contend that the induction furnace can produce in any given analysis a steel superior to the best made in an arc furnace. As an operator of both types, he finds that induction furnace steel is of more uniform high quality. This he attributes to the simplicity of induction furnace practice with a minimum of reliance upon the human element.

One of the points brought out by W. C. Harris, metallurgist, Birdsboro Steel Foundry & Machine Co., Birdsboro, in his paper on acid open-hearth practice, was that at his plant pig iron is charged first. When the iron is thus charged and spread evenly over the bottom of the hearth, he explained, the iron attacks the bottom to a lesser degree than the heavier scrap; and the iron having a lower melting point than the remainder of the scrap melts first to form a pool of metal which is covered by a slag high in manganese oxide and silicon dioxide.

Mr. Harris gave the following operating data: Fuel consumption ranges from 27 to 30 gallons of oil per ton of metal; furnace roof usually runs from 800 to 1000 heats before requiring attention; sidewalls are repaired after 300 to 350 heats; and checkers and slag pockets are good for 550 to 600 heats.

Would Improve Draft

Basic open-hearth practice was covered by J. W. Porter, American Steel Foundries, East Chicago, Ind., who recommended two sources of draft—a fan to force air into the furnace and a stack to draw air out of the furnace. In making alloy additions, the speaker favors adding 15 per cent ferrosilicon to the bath 10 minutes before tapping. A charge of 80 per cent manganese is added to the ladle through a chute, the amount varying in accordance with the residual manganese in the bath. For adjusting silicon content, 50 per cent ferrosilicon in ½-inch lumps is added through a chute over the furnace runner.

Methods of making basic electric steel by the arc furnace were outlined by C. W. Briggs, technical advisor, Steel Founders' Society of America, Cleveland. He directed attention to a modification of the double slag process wherein aluminum is used in place of carbon to obtain a reducing slag. This type of slag, he explained, finds its greatest application in stainless steel or other alloys where it is desired to maintain carbon content at a low figure. The method has equal application to carbon steels and low-alloy steels.

Lime should be mixed with the aluminum, Mr. Briggs asserted, so that it may be spread more evenly over the bath and to prevent the slag from becoming too fluid. Analyses have shown no aluminum pickup.

Of the approximately 265 foundries in this country, which in 1937 manufactured steel castings, 175 used the electric melting process for part or, in most cases, for all of their production. This fact was brought out by Werner Finster, metallurgist, Reading Steel Casting division, American Chain & Cable Co., Reading, Pa., who devoted his paper to acid electric practice.

Majority of the arc furnaces for steel foundry use are acid lined, he stated. When charging 5 tons per heat, his average on five linings and roofs was 900 tons; when 4-ton heats were charged, life of roof was increased to 1000 tons and lining to 1200 tons.

Speaking at one session, H. H. Blosjo, metallurgist, Minneapolis Electric Steel Castings Co., Minneapolis, described a rugged but inexpensive instrument for rapidly determining carbon in the melt of small electric furnaces. The unit compares magnetic permeability of a bar of unknown carbon content with permeability of a bar of known carbon.

According to the speaker, the instrument has proved valuable for control of carbon in low-alloy steels, where the alloy residuals are controlled closely; it is especially valuable to a foundry whose production is mainly plain carbon steel and whose melting equipment is rapid.

Determines Sand Strength

Data which is characteristic of molding sand in general but in particular with synthetic bonded sands containing washed silica sand, bentonite and water, were dealt with in a paper by C. W. Briggs, Steel Founders' Society of America, Cleveland, and R. E. Morey, naval research laboratory, Anacostia, D. C. This paper brought out that necessary strength for molding sands ranges from 2 to 12 pounds per square inch and that these strengths are produced by addition of from 2 to 10 per cent bentonite.

The official exchange paper of the Association Technique de Fonderie de France, contributed by G. Delbart, Denain, France, pointed out that homogeneity of cast steel evidently is in direct relation with the primary structure, since the cast steel always preserves its solidification structure under a form more or less attenuated. It is known that the solidification grain is refined by additions of vanadium, molybdenum, titanium, and a simple addition of 0.15 per cent vanadium

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HEREWITH is concluded the report of important technical sessions held during the forty-third annual convention of the American Foundrymen's association in Cincinnati, May 15-18. A number of sessions were reviewed in STEEL last week, pages 69-71

decidedly improves mechanical properties of a cast steel even after a simple anneal not preceding homogenization.

Report of A.F.A. committee on heat treatment of steel castings, presented by Chairman D. C. Zuege, Sivyer Steel Casting Co., Milwaukee, incorporated a survey made for 1938. Data show that 45 per cent of all the open-hearth foundries reporting made 5 per cent or less alloy steel while the electric steel foundries showed only 20 per cent making carbon steels almost exclusively. Obviously, as the percentage of alloy steels increases the complexity of heat treatments increases.

About 76 per cent of the open-hearth foundries indicated that they are giving 100 per cent of their castings some type of heat treatment. In this group 17 foundries reported that they use pit or car-type furnaces exclusively. In the electric foundries 20 reported that they did not use hearth or box-type furnaces while 14 used hearth-type to supplement their car-type equipment. Only four of the newer recirculating air-type furnaces for drawing are used in foundries reporting.

Average of 14 foundries using oil exclusively as fuel showed an average cost of $1.73 per ton, seven using gas exclusively had a gas cost of $2.13 per ton, while four foundries using electricity averaged $6.03 per ton for castings treated. Out of 60 foundries, 27 are still controlling all temperatures manually through guidance by indicating or recording pyrometers while 33 foundries use automatic temperature control on at least some of their units.

The most popular quenching medium is water, 19 foundries reporting to this effect. About one-third reported that on alloy steels, especially if they are of the air-hardening type or are intricate in shape, a preheating treatment is given the castings before cleaning.

Resisting High Temperatures

Contributing a paper on high alloy steel castings for heat and corrosion resistance, James Corfield, Michigan Steel Castings Co., Detroit, pointed out that choice of materials for castings intended for use at high temperatures involves consideration of two major factors —resistance to chemical attack and physical strength. In oxidizing conditions a minimum of about 15 per cent chromium plus at least 12 per cent nickel is required, while in a high sulphur atmosphere 24 per cent chromium is essential.

In selecting an alloy for castings for use in a corrosive environment at normal or moderately high temperature, safest method is to expose test pieces under actual operating conditions, Mr. Corfield said. Where previous experience indicates the type of alloy required, details of analysis should take into account the factor of castability and other features which render the material adaptable. Up to the present no standardized system of classifying heat and corrosion-resisting alloys according to chemical analysis has been adopted.

A paper on copper as an alloying element in cast steels, prepared by C. T. Greenidge and C. H. Lorig, Battelle Memorial institute, Columbus, O., discussed effects of copper additions up to 2.40 per cent. The low alloy cast steels considered in the investigation contained one or more of the following elements: Vanadium, titanium, aluminum, molybdenum, columbium, zirconium, chromium, silicon and manganese, the last two in higher than normal percentages.

Results indicate that copper contents above 0.50 per cent increase markedly the tensile and yield strengths of fully annealed, normalized and quenched and drawn cast steels with only a slight lowering of ductility and resistance to impact. Several alloying combinations containing copper and one or more of the other common alloying elements are satisfactory in the low-alloy, high-strength cast steels.

Gray Iron

■ Interest in activities of the gray iron division ran high. Three technical sessions were conducted and provided nine papers on various phases of iron foundry practice, improvements in irons, and heat treating procedure.

Experimental work to determine cause of a crack in the central web of a cylinder block and the means adopted to solve the problem were outlined in a paper by L. A. Danse, Cadillac Motor Car division, General Motors Corp., Detroit. Following an obvious theory that the crack was caused by stresses set up in cooling of the casting, a number of thermocouples were placed at strategic points in the green sand body cores and readings were plotted.

Solution of the problem was found in construction of an oven through which the castings pass immediately after they are shaken out, and in which the temperature is maintained at approximately 1200 degrees Fahr. for 3 hours and then lowered gradually. The treatment is somewhat similar to that accorded cast iron car wheels, with exception that the period is shorter.

Procedure for producing iron having a tensile strength of 60,000 pounds and more per square inch was described in a paper by E. L. Roth, president, Motor Castings Co., Milwaukee. Total carbon content is in the vicinity of 3.10 per cent. By proper cupola manipulation the iron is machinable in castings as small as 3-pound gears. Illustrating potential possibilities of this iron, the speaker stated that test bars heat treated and quenched in oil showed an ultimate tensile strength of 91,000 pounds per square inch. The material has high wear resistance and good machinability.

The official exchange paper of the Institute of British Foundrymen, contributed by F. Whitehouse, Newton, Chambers & Co. Ltd., Chapeltown, England, described some of the castings employed in the British gas industry, with reference to molding and coremaking methods, also chemical and physical properties of the irons which have proved most suitable.

British Molding Practice

According to Mr. Whitehouse, castings are made almost entirely in green sand. A naturally bonded sand is used, mixed either by hand or being put through a pin-type disintegrator. Facing sand contains approximately 10 per cent fine coal dust (200 mesh) and the new sand addition varies from 5 to 30 per cent. In comparison with American sands, the following data is of interest: Refractoriness 1710 degrees Cent.; sinter 1340 degrees; loss on ignition 2.00 per cent; silica 80.92 per cent; iron oxide 1.57 per cent; alumina and titania 6.87 per cent; lime 0.40 per cent; alkali oxides 2.76 per cent.

Fulton Holtby, University of Minnesota, Minneapolis, described an investigation of rapid temperature measurements of cast iron. Results indicated that a tungsten-graphite thermocouple protected by a sillimanite tube gave good results. Advantages claimed are that high temperature measurements can be made, that determinations can be made rapidly, it is not affected by smoke and slag, it can be made smaller than other types, and it is low in cost.

Copper, aluminum, silicon alloys for addition to cast iron were considered in a paper by V. H. Schnee and T. E. Barlow, Battelle Memorial institute, Columbus, O. The alloy contained 6 per cent aluminum, 12 per cent silicon and 80 per cent copper. Results indicated that additions of 1 per cent are more effective in raising tensile strength and toughness as measured by resilience than additions of 0.5 per cent silicon added as ferrosilicon.

Discussing this paper, C. O. Burgess, Union Carbide & Carbon

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Research Laboratories Inc., Niagara Falls, N. Y., questioned relation of results between ferrosilicon and the aluminum-silicon alloy. He said there was too much difference in the composition of the materials. He believed that the final silicon and carbon contents of the irons used should be more comparable.

Richard Schneidewind, University of Michigan, Ann Arbor, Mich., observed that the results obtained by Messrs. Schnee and Barlow paralleled work he and his collaborators had performed, but pointed out, however, that deflection in the base iron was low, and that any addition at all would tend to increase that value.

Undercooling in Gray Iron

A paper by Mr. Schneidewind and C. D. D'Amico, also University of Michigan, Ann Arbor, Mich., reported on undercooling influence on graphite pattern of gray iron. Results indicated that gray iron is susceptible to undercooling. This undercooling may be as great as 100 degrees Fahr. below the theoretical equilibrium freezing point and still produce gray iron; solidification temperatures between 2060 and 1970 degrees Fahr. will produce graphite patterns characteristic of actual freezing temperature, the lower the temperature, the finer will be the graphite and the greater the tendency for a eutectiform pattern; greater degrees of undercooling will inhibit precipitation to form mottled and white irons, and undercooling increases the resultant austenite transformation rates.

In another paper, Mr. Schneidewind and R. G. McElwee, Vanadium Corp. of America, Detroit, discussed the influence of composition on electric furnace irons. From their investigation the authors concluded that basic composition, carbon and silicon, markedly affect physical properties; that the factor of carbon plus one-third silicon is a practical means of determining the relationship; ladle deoxidation improves strength, deflection and Charpy impact over a wide range of compositions, and addition of up to 0.3 per cent vanadium increased tensile and transverse strengths and brinell hardness, and irons alloyed showed greater uniformity heat to heat.

Some factors involved in hardening and tempering gray iron were considered in a paper by G. A. Timmons, V. A. Crosby, and A. J. Herzig, Climax Molybdenum Co., Detroit. The authors heat treated one unalloyed and five alloyed irons in the conventional manner, by flame hardening, and in a manner suited to study effect of quenching temperature on combined carbon.

Some of the conclusions reached were that graphitization of unalloyed pearlitic cast iron takes place rapidly at 1300 to 1450 degrees Fahr., effect of alloys on graphitization rate and transformation rate are useful in controlling hardenability, and quenching and drawing is an effective method for increasing hardness and tensile strength at some sacrifice in shock resistance, transverse strength and deflection.

Effect of heat treatment on combined carbon and physical properties of car wheel iron was dealt with in a paper by S. C. Massari, Association of Manufacturers of Chilled Car Wheels, Chicago. More specifically it was concerned with the gray iron portion forming hub and web of the wheels. Results indicate that no decomposition of combined carbon occurs when the iron is heat treated at temperatures up to and including 1000 degrees Fahr. as long as 96 hours, and the physical properties as cast are not affected.

Heat treatment at temperatures just below critical causes substantial decomposition of combined carbon, degree of breakdown being dependent upon temperature. Decomposition of carbide is practically complete at 1200 to 1310 degrees Fahr. Most physical properties are lowered considerably, only impact strength showing an increase. When heat treatment is carried out above critical range 1500 to 1700 degrees Fahr. only a portion of combined carbon is decomposed; an equilibrium value of about 0.4 per cent residual combined carbon is established.

When distribution of graphite is normal the physical properties of gray cast iron are dependent upon structural condition of the matrix, and are best when the matrix is entirely pearlitic.

Job Analysis

■ Systematic approach to job analysis frequently is conducive to improvements, declared C. J. Stegemerten, superintendent, time study and methods department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is presenting a paper at the job analysis session. He cautioned that analytical work continues in more or less detail throughout the entire study.

Analytical work is conducted successfully when a peculiar mental attitude is developed. There is a natural tendency to take pride in the familiarity with a subject. The speaker cited a job which was improved to such an extent by detailed motion study that time of operation was reduced to one-sixth of the time required under the original method. He directed attention to the fact that the best method of doing an operation from a labor economy standpoint is reached only when the labor required has been reduced to zero. Until then, he stated, further improvement always is possible.

Improvement often is afforded by suggestions, Mr. Stegemerten stated. He warned, however, that true worth of each suggestion should be evaluated carefully before it is offered. The quickest way to prove merit of any suggestion is to obtain estimates of cost of adopting it and total yearly savings it may be expected to effect. When the suggestor has convinced himself of the value of his idea, he should present it to the one who is in a position to adopt it.

Three reels of motion pictures demonstrated how motion study of various operations in Westinghouse plants has improved operations.

Apprentice Training

■ Men must be trained more thoroughly and the training must be in the fundamentals of mechanics. This was the contention of H. K. Ewig, Cincinnati Milling Machine Co., Cincinnati, speaking on "Training of Apprentices" at the apprentice training session.

Describing the training program in his plant, Mr. Ewig stated that all apprentices are required to enroll in an evening school. The company pays the tuition; apprentices buy their own books and supplies. Weekly education meetings are held at which the boys are given opportunity to speak to improve their leadership.

All shop work of apprentices is taken from regular production schedules. A control board is kept in the office and all the work of the boys is plotted. Upon completion of the course a bonus of $150 is paid by the company. The speaker pointed out that it is important to have a short training program to balance manpower in the plant. This training, he explained, is a joint responsibility of the foundry superintendent, foremen and key men.

Apprentices of the regular indenture class, Mr. Ewig stated, are started at a wage rate of 30 cents an hour and are entitled to increases every three months, depending upon scholastic and shop performance.

C. J. Freund, dean, college of engineering, University of Detroit, Detroit, stressing importance of choosing boys who are able to think straight, inquired as to what means the speaker's company used in discovering boys who will make good mechanics. Mr. Ewig explained that a majority of the apprentices are sons or relatives of men working in the plant, and therefore have

(*Please turn to Page* 66)

Ingot Mold Insulation

(*Concluded from Page 46*)

and thus permitting a higher yield.

Use of this ingot mold insulation not only gives greater yield but greater flexibility in pouring as explained above. In one instance, a large casting was poured in the afternoon and by use of this ingot mold insulation, it was possible to maintain a condition in the mold so that additional pouring on the same ingot was made successfully the following morning.

Since the new insulation contains only cork and clay, there are no ingredients which may affect chemical change in the steel with which the material comes in contact. A number of ordinary materials used on top of ingot molds have a tendency to follow down the piping and result in a decided carbon pickup on the sides of the pipe. This changes the carbon in the steel to an extent where it probably will not meet specifications. Use of this ingot mold insulation completely eliminates carbon pickup from this cause.

The new ingot mold insulation derives its high insulating qualities from the use of cork granules. These granules are surrounded by clay which retards combustion of the cork. The material is very light, weighing only 25 pounds per cubic foot. It is usually applied by throwing a paper bag of the material onto the ingot top immediately after pouring.

Ingot Size Regulated

Another advantage is that use of this material permits better regulation of ingot size. In pouring production steels for such materials as I-beams or plates, the amount of steel placed in the individual ingot is calculated so a definite number of lengths can be produced without an odd-length piece of scrap remaining. Using ingot mold insulation. the additional metal included in an effort to get a whole number of pieces from the ingot does not have to be so great. This is an added economy.

The material thus appears to have considerable importance as an ingot mold insulation. Wherever tests have been made, results have been quite satisfactory and the present users of the material are rapidly increasing their consumption as they become better acquainted with the possibilities of this insulation. Since the only way to determine what value the material has in any one plant is to test the material's actual work, the manufacturer is co-operating with steel makers in a large number of tests now going on in plants throughout the country.

Pipe Specifications for Temperature, Pressure

■ *A.S.T.M. Specifications for Pipe and Piping Materials for High-Temperature and High-Pressure Services*, paperboard, spiral ring binding; 135 pages, 6 x 9 inches; published by American Society for Testing Materials, Philadelphia; supplied by STEEL, Cleveland, for $1.25; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W. 1.

Committee A-1 of the American Society for Testing Materials for several years has been developing specifications covering steel materials for high temperature service. Several standards have been issued and published as separate pamphlets and also in the book of A.S.T.M. standards. To make specifications in this particular field available in convenient, compact form this volume has been prepared, containing 18 specifications, covering carbon steel and alloy steel pipe and tubing, castings, forgings and bolting, all of which have been used extensively. Several have been approved as American standards by the American Standards association.

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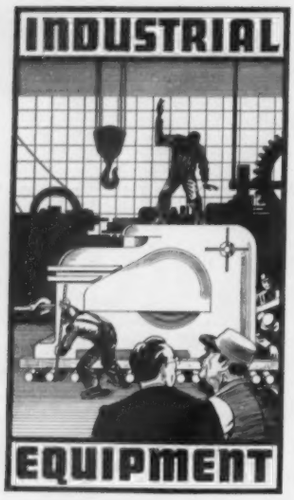
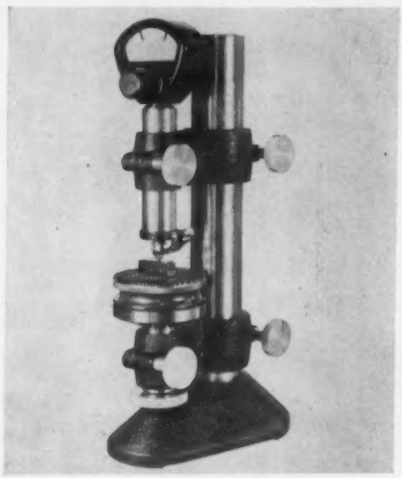


Measuring Instrument

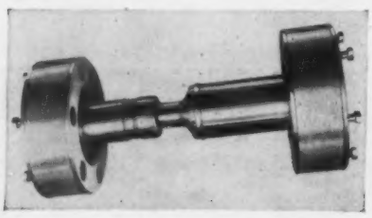
■ Swedish Gage Co. of America, 7306 Woodward avenue, Detroit, has developed the Mikrokator having "dead-beat" characteristics and no friction bearings, gears, levers or other moving parts. Pointer is mounted in center of a metal strip twisted in a helix and responds instantly to slightest movement of



measuring tip without swinging past true reading. No lights or electromagnets are used. Scales are graduated to 0.0001, 0.00005 and 0.00002-inch and can be read to one half scale division.

Coupling Drive-Shaft

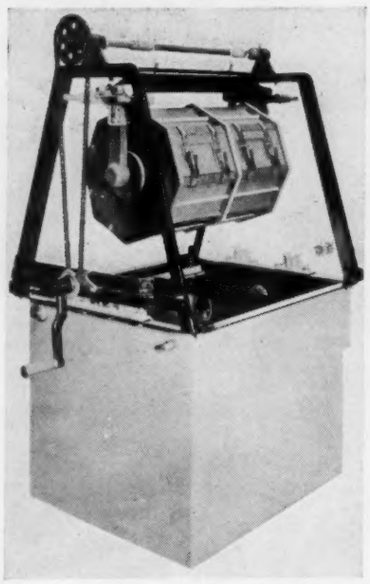
■ Morse Chain Co., Ithaca, N. Y., offers Morflex radial coupling drive shafts in two types with capacities from 2 to 27 horsepower per 100 revolutions per minute. Long-



coupled type has tubing added as required and short-coupled type is standard length. Slip joint is full spline construction, grease tight and slides freely under load. Shaft members are machined from steel forgings, piloted into coupling hub members and welded. Entire shaft is balanced. Unit is adapted for use on dynamometer drives and others with endwise shaft float.

Plating Barrel Hoist

■ Hanson-Van Winkle-Munning Co., Matawan, N. J., offers a hand-operated hoist for single cylinder plating barrels which consists of an iron framework carrying a 1¼-inch shaft on two brackets. At end of shaft is a ⅝-inch pitch, 36-tooth



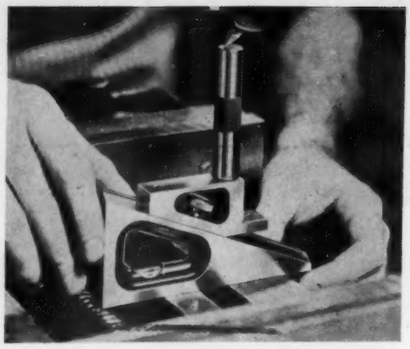
sprocket connected to a 12-tooth sprocket at lower end, with a ⅝-inch pitch roller chain. Crank can be placed on opposite side of tank and requires 15 turns to lift a 14-inch diameter barrel and 17 turns for a 20-inch barrel.

Carbide-Drill Set

■ Super Tool Co., 21650 Hoover road, Detroit, offers carbide-tipped drills for masonry and other nonmetallic materials, in portable cases. Sets are in three sizes and contain drills from 3/16-inch to ¾, 1, and 1½ inches respectively.

Precision Gage

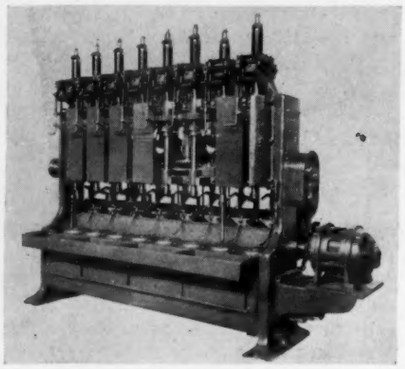
■ The L. S. Starrett Co., Athol, Mass., has designed precision gage No. 599 for planer and shaper work. Range with 3-inch extension used on longer measurements is ¼ to 9 inches. Level built into gage aids in setting up work on planer table. Base dimensions are ¾ x 5¼ inches. Extension is ⅝-inch diameter x 3



inches long. Weight is approximately 25 ounces.

Coupling Tapper

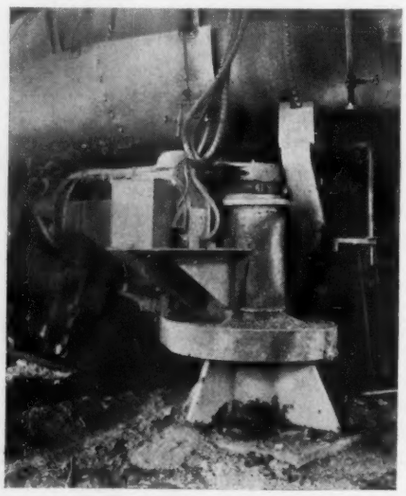
■ The Acme Machinery Co., 4533 St. Clair avenue, Cleveland, has a 2-inch 8-spindle coupling tapper with



leadscrews. Leadscrew nuts open automatically after couplings have been completely tapped. Air chucks are automatically valved. Quick acting ring socket allows operator to unload while spindle is rotating. Speed changes of spindles are obtained by pick-off gears.

Pedestal Clay Gun

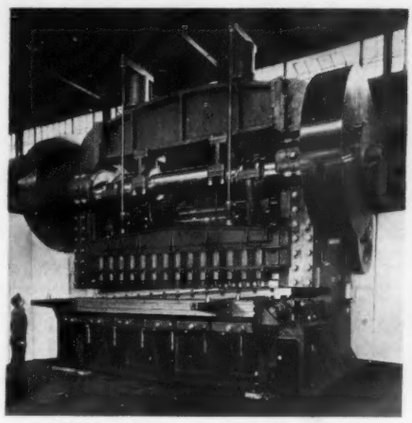
■ Edgar E. Brosius, Inc., Sharpsburg, Pa., has developed a pedestal type clay gun which is altogether independent of furnace struc-



ture, and is tilted at a predetermined point, at proper angle, to hit tap hole in exact position. Barrel has a capacity of 9 cubic feet. Cast steel crane is so tapered that operator has a clear view of tapping hole at all times and can pass under boom to work around trough while gun is in hole.

Large Plate Shear

■ Thomas Machine Co., Etna P.O., Pittsburgh, has built a plate shear reported to be world's largest for use in a Soviet mill. Of cast steel construction throughout the machine shears plates to 2½ inches thick by 162 inches wide. Gear drive is operated by magnetic clutch combined with brake. Ram can be stopped at any point of stroke and can be "inched" down. When machine idles, only flywheel shaft and



motor are running, gear train being at rest. Holddown, synchronized with ram, is operated by air but can also be controlled hydraulically. Knife on ram can be changed for splitting or slitting plates. For shearing plates on a bevel up to 30 degrees, motor-driven raising and lowering screws are provided.

Welding Coating

■ The Wayne Chemical Products Co., 9502 Copeland avenue, Detroit, has introduced Spatter-Ex and Flash-Ex, both water-soluble compounds, to prevent bonding of spatter and flash in welding operations. Spatter-Ex protects part being welded in arc, flash or butt welding. Flash-Ex, used in resistance welding, prevents dies and welding holder jaws from becoming jammed with spatter and with nonferrous metals having greater heat conductivity than steel.

Electrode Remover

■ Progressive Welder Co., 737 Piquette avenue, Detroit, offers a taper point-puller for hydromatic and multiple spot welders. It has automatic locking, positive grip and straight-line pulling action. A tap of hammer on bottom of puller removes electrode from holder without damage to welding point seats. Shocks are absorbed largely within puller, affording additional protection to welder.

Open-Back Press

■ Minster Machine Co., Minster, O., offers a line of open back inclinable presses in nine sizes, ranging in capacity from 12 to 113 tons. Frame has box type construction with 45 degree overhanging crankshaft bearings. Brake has constant braking torque. Brake shoe is two-piece assembly, having four segments of oil-proof molded lining and is finned to aid heat radiation. Multi-engage spline clutch has 10 to 22 points of engagement, depending on size.

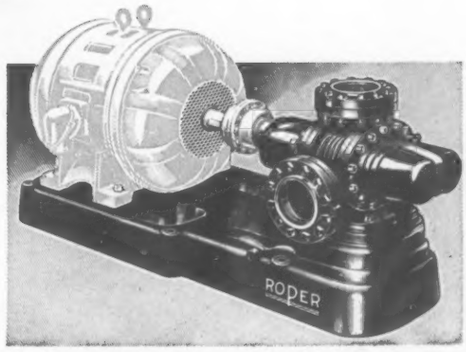
Heavy Duty Rheostat

■ For adjusting speed of motors in severe service, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a mill-type field rheostat with 60 point speed control and individual resistance tubes. Entire assembly is in a wall-mounting steel enclosure perforated for ventilation.

Service
IN EVERY SENSE OF THE WORD

In that one simple statement, pump users the country over sum up their experience with DEPENDABLE Roper Rotary Pumps. Some like the Roper SIMPLICITY of design, EASE of installation and LARGE capacity. Others know that they have profited from the LOW original cost, LONG life, LOW operating cost, LOW maintenance cost and TROUBLE-FREE performance. If you are interested in any of these features —write for latest bulletin on Roper Pumps.

ROPER Rotary PUMPS
DEPENDABLE - SINCE 1857



GEO. D. ROPER CORPORATION
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Automotive Engineers Open World Congress; View Future Progress

■ THAT the automotive industry will make strides over the next 10 years which will far out-distance progress of the past decade was the prediction made by leading engineers who gathered in New York last week from all parts of the world to participate in the opening of the World Automobile Engineering congress, which, following New York, will be held progressively in Indianapolis, May 29-30, Detroit, May 31-June 2, and San Francisco, June 6-8.

This forecast was based on the increasing trend toward closer cooperation and still freer exchange of ideas by automotive engineers of all countries with "real progress knowing no political or international boundaries."

Principal job is to maintain the engineering, or factual approach, said W. J. Davidson, general sales manager, diesel engineering division, General Motors Corp., Detroit, and president of the Society of Automotive Engineers, sponsor of the congress. This approach, he said, consists of getting facts in impartial manner, and then through discussion endeavoring to develop what the facts indicate.

He warned that today the world is influenced too much by emotion, rather than by facts, and declared that it is a cardinal principle with the engineer "never to tear down anything without putting up something equally good in its place."

Congress to Move West

Approximately 4000 automotive engineers, representing 20 different countries, are expected to attend the sessions in the various cities—sessions so timed and arranged as to enable the members to visit the world fairs in New York and San Francisco, attend the 500-mile Memorial day sweepstakes in Indianapolis and visit the many points of interest to automotive engineers in Detroit.

Formal meetings in New York, which began May 22, were concluded at a banquet May 26 at which C. F. Kettering, vice president in charge of research, General Motors Corp., Detroit, spoke on "Engineers' Problems in the World of Tomorrow."

Alfred Reeves, general manager, Automobile Manufacturers' association, New York, predicted that production this year will reach 3,500,000 passenger cars and trucks, and said that the greatest work which still lies ahead of the automotive engineer is to create machines that will serve all the people best at the lowest cost consistent with safety. He emphasized that competition in the automotive industry has been one of quality and not costs, although costs have been declining steadily as quality has advanced. He looks for continued heavy increases in automobile purchases and said that the bureau of public roads is planning highway improvements 20 years ahead in expectation that traffic will be doubled by that time.

Mr. Reeves decried any move toward punitive taxes to equalize transportation costs among different types of carriers and insisted that there should not be any diversion of highway funds.

A stout defense of the machine in its bearing on social and industrial problems was registered by W. A. Cameron, Ford Motor Co., Detroit, speaking on May 23. The attack on the machine, he said, varies, but the most persistent charge and the one enlisting greatest sympathy is that it destroys men's jobs and reduces employment.

Statistics Back Up Contention

He claimed that statistics do not bear out this contention and said it is a fact of still greater importance that working men themselves seldom blame a machine for their unemployment. He quoted an authority to effect that of 3,633,896 persons reporting unemployment in the 1930 census only a total of 10,651 persons, or less than a third of 1 per cent, gave machinery as the reason.

Mr. Cameron said he noted a growing tendency on the part of business spokesmen to concede that in the past machinery has put men out of work. All recognize the dislocation that resulted from the first impact of the "machine age," a dislocation, he asserted, that was speedily remedied by absorption of most of the dislocated workers into new industries.

"But," he said, "it is a question whether our conceding that the machine did the harm is justified. Because if that is true, it is likely to occur again, and I am bold enough to say that it will never occur again however rapidly we advance in automatic machine development."

The reason, in his opinion, is that "men of the present generation, unlike their fathers, are not looking forward to doing the same old things in the same old way for the rest of their lives. There is not a young man in industry today who does not know that change is the keynote of progress. . . . Never again will an American generation be taken by surprise as was the last generation."

•

Urges Reform in Pricing Policies

(*Concluded from Page* 19)

prices. It lies entirely with the steel industry itself.

In this connection there is a tradition in the industry which leads to no good. I refer to the practice of announcing price changes upward weeks in advance of the effective date, while price changes downward go into effect at once.

Advance notices for price increases frequently operate as an artificial stimulant upon demand. Buyers rush in or are encouraged to place tonnage as far ahead as possible at the currently low price. The result is a spurt in activities followed by a sharp decline which may have serious adverse effects upon general business conditions.

In meeting the obligation to the public in general, the industry has but one test to apply—are its policies in the public interest?

It is not always easy to answer that question. In the minds of some there may even be haziness as to what is the public interest. With regard to its own affairs, I believe that the industry meets the test successfully in all respects except that of earning fair profits. It pays good wages and maintains good labor relations; it makes good steel and sells it at fair prices.

Interests Are Two Fold

But the steel industry must take an enlightened interest in public affairs. It is no longer possible for any industrial executive to think only in terms of his own company or his own industry. No company nor industry can live in a vacuum. Policies of government and opinions of people are of direct concern to industry. By the same token the problems of welfare of industry are of direct concern to the government and to the people.

The steel industry cannot afford to fail in keeping abreast of changing trend in a changing world. It must be ready to adapt itself to new conditions and to adopt new ideas when they appear to be sound and in accord with the general welfare. But this does not mean that the industry should permit itself to be stampeded by unfair and unsupported criticism into abandoning principles that are right and traditions that are sound. It is when criticism is contructive and considerations of public interest are impelling that changes should be made.

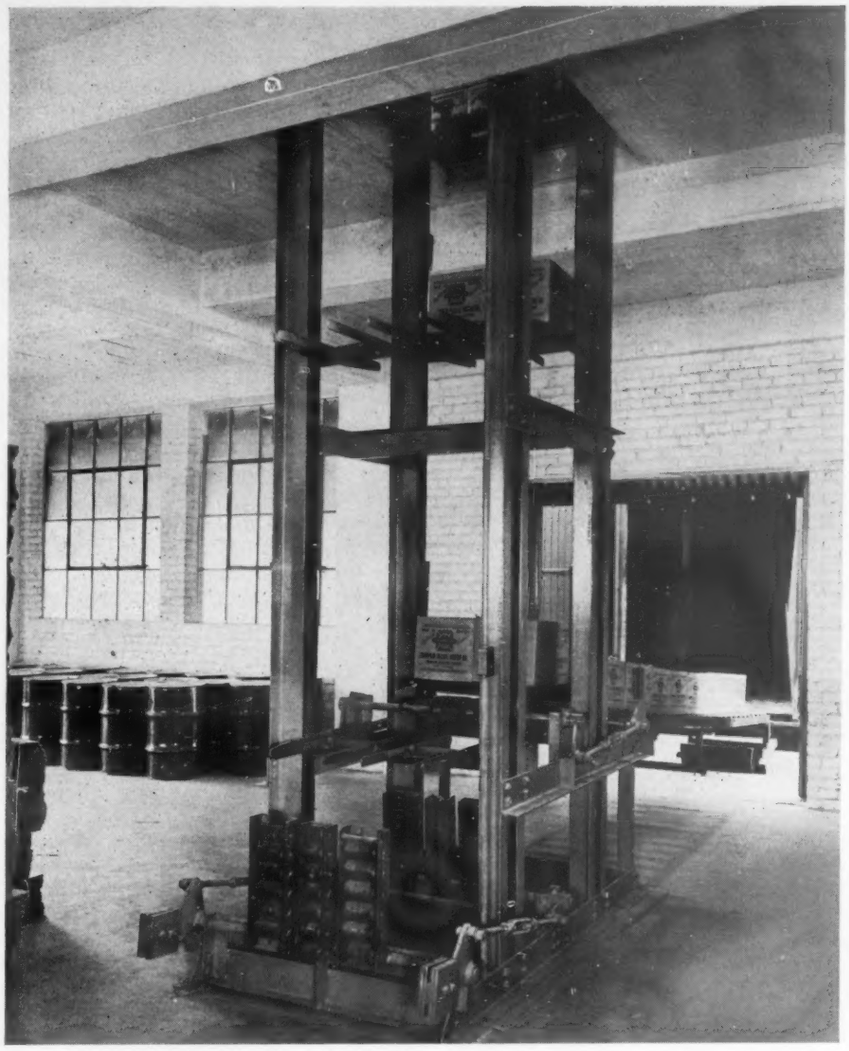


Fig. 5—Discharge end of package lowerator with sections of portable roller conveyor carrying items directly to freight car for loading

New Barrels From Old

(*Concluded from Page 52*)

siding. This affords extremely rapid loading of cartons with minimum amount of handling operations from storage to shipping.

Fig. 5 also reveals a good view of the finger platforms which interleaf between the short roller conveyor sections to lift and deposit products as the chain carrying the fingerlike platforms revolves around drive sprockets. Also it will be noted, the short roller conveyor sections are hinged at the outer end so they can be tipped up in a position where they will not engage the finger platforms of the lowerator. This permits flexibility in operating the machine. The lowerator is started and stopped from a convenient push-button station which can be seen at the right of the loading platform in Fig. 4.

This equipment, with few variations, is employed in a large number of oil refineries to handle barrels, drums and cartons, through filling and storage to the shipping department. These systems often are connected directly to portable gravity roller conveyor sections to deliver items on the loading platform directly in front of the flat car door. In some instances they may even extend inside the freight car when first starting to load the car at an extreme end.

By incorporating variable speed transmissions in the drives of such units, the delivery speed can be varied according to the size and weight of the particular items being loaded. This permits maximum speed of loading operations permitted by the weight and bulk of the packages being handled. Handling equipment described here was built by C. O. Bartlett & Snow Co., Cleveland.

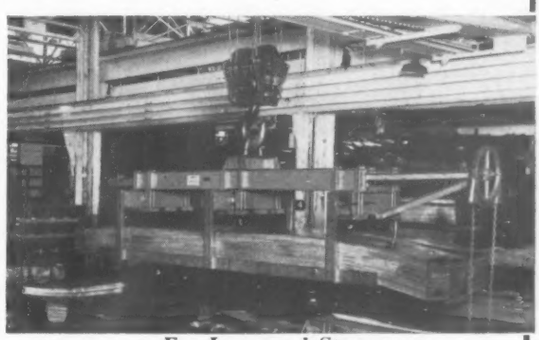
♦

Steel House Structures Are Investigated

■ "Building Materials and Structures," Report BMS 9, issued by the National bureau of standards is a survey of the structural properties of low-cost steel house constructions. For this test program Insulated Steel Construction Co. submitted 30 specimens representing their Frameless-Steel constructions for walls, partitions, floors and roofs. Specimens were subjected to proper loads — compressive, transverse, concentrated, impact or racking. Three similar specimens were tested for each load. Results are presented graphically and in tables. Publication from Superintendent Of Documents, Washington, D. C., 10 cents.

Streamline Car Builders . . .

SUCH AS
E. G. BUDD MFG. CO.
Use
MANSAVER GRABS



For Increased Storage

The Mansaver Grab, shown in the illustration has greatly increased the amount of steel stored in a given space. It has resulted in increased safety and decreased handling costs.

Mansaver Grabs are used by E. G. Budd Manufacturing Company for handling sheets in 20,000-pound unit loads, coils in 20,000-pound unit loads and other materials. Let us show you how similar savings can be made in your plant.

J-B ENGINEERING SALES COMPANY
1743 Orange Street **New Haven, Conn.**

A.S.M. Chapters Meet in East

■ MEMBERS of the Middle Atlantic chapters of the American Society for Metals, including the New York, New Jersey, Penn State, York, Lehigh Valley, Baltimore and Philadelphia chapters, conducted a one-day meeting in Philadelphia, May 19. The program provided a morning technical session, a luncheon, a plant visitation in the afternoon and a dinner in the evening.

H. J. French, International Nickel Co. Inc., New York, presided at the technical session at which Dr. E. C. Bain, assistant to vice president, United States Steel Corp., Pittsburgh, spoke on "Functions of the Several Alloying Elements in Steel," and F. B. Foley, Midvale Co., Philadelphia, recounted the "History of Valley Forge."

G. E. Whitwell, vice president, Philadelphia Electric Co., Philadelphia, addressed the luncheon, after which the visitors were shown the blast furnaces, coke ovens, open hearths, and sheet and plate mills of the Alan Wood Steel Co., Conshohocken, Pa. W. H. Eisenman, national secretary, American Society for Metals, Cleveland, was toastmaster at the dinner, at which Dr. John R. Hart, rector, Washington Memorial chapel, Valley Forge, Pa., spoke.

That additions of small amounts of alloying elements result in profound changes in the structure of steel was the point which Dr. Bain emphasized in his paper. Small amounts of nickel or chrome-molybdenum, for example, increase hardness of steel on quenching over ordinary carbon steel, he said, even where the heat treatments are identical.

Grain Size and Hardenability

Metallurgically speaking, he stated, steel cooled, even though only rolled, is heat treated. However, such steel is not heat treated in a technical sense. Rapid cooling results in finer structure, he asserted, and added that grain size has a definite effect on hardenability but is not the sole factor. Toughness builds up as grain size becomes smaller.

Dr. Bain said that hardenability of carbon steel has been found to increase on successively higher quenching temperatures. Surface conditions also are important. Discussing alloying elements further, Dr. Bain said that practically all elements except cobalt contribute to deep hardening.

In discussion, N. C. Mochel, metallurgist, Westinghouse Electric & Mfg. Co., Philadelphia, noted that Dr. Bain's findings had been obtained from steels with relatively small cross sections. He said that a good many steel users, of course, are interested in heavier sections, but pointed out that the principles set forth by Dr. Bain still apply and thus may be utilized.

A.S.T.M. Program

(*Concluded from Page* 53)

Sam Tour, Lucius Pitkin Inc.

"Service and Life of Nonferrous Tubes in Petroleum Refining," by E. S. Dixon, Texas Co.

Report of committee B-6 on die-cast metals and alloys.

"Magnesium Alloy Die Castings," by A. W. Winston, Dow Chemical Co.

Report of committee B-7 on light metals and alloys, cast and wrought.

Report of committee B-4 on electrical-heating, electrical resistance and electric-furnace alloys.

"Spectral Emissivity of Some Alloys for Electrical Heating Elements," by W. F. Roeser, National bureau of standards.

Report of committee E-2 on spectrographic analysis.

"Spectrographic Analysis of Tin," by J. Warren Stewart, Carnegie Institute of Technology.

Report of committee E-3 on chemical analysis of metals.

"Determination of Silicon in Certain Aluminum Alloys Containing Silicides," by Thomas A. Wright and John Jicha, Lucius Pitkin Inc.

Cemented Carbide Plant

(*Concluded from Page* 45)

around the nib. One 250-ton, and one 50-ton percussion press are, at present, installed for this operation. The process provides complete support for the nib except at the hole through which the wire, bar or tubing passes. Through controlled heat treatments and selection of proper casing steels, the internal pressures set up by the drawing operations for which the dies are used are balanced with external pressure of the casing against the nib. Casings up to 9 inches in outside diameter have been handled on this equipment.

Maintenance and General Facilities

Among the economy features built into this new plant is the special provision for water and metal salvage. A series of covered trenches built into the floor of the plant, direct all drainage water, except that used for sanitary purposes, into a special settling tank. This water is then pumped into a cooling tower and recirculated for use in the air-conditioning system, cleaning, and for general manufacturing purposes. The system also provides for the periodic salvaging of powdered carbides and other metals of value that accumulate as a result of maintenance cleaning.

Apprentice Training

(*Concluded from Page* 60)

a good background. The committee never hesitates to call in a parent and explain why his boy was not chosen.

J. E. Goss, Brown & Sharpe Mfg. Co., Providence, R. I., asserted that among employes in shops of his company are many relatives and experience shows they help to eliminate politics.

M. J. Gregory, factory manager, foundry division, Caterpillar Tractor Co., Peoria, Ill., presenting a paper on "Foundry Apprenticeship," emphasized that no relatives are employed. Over 600 boys are in training in the machine and pattern shops and in the foundry. He pointed out that practice is to pay an hourly rate to apprentices and to ignore the bonus system.

He directed attention to importance of studying every phase of the foundry industry, pointing out that it is now on a scientific basis. Many foundries are being operated by patternmakers these days, he charged. It is important for the apprentice to have a knowledge of his casting as it leaves the machine shop and he advocated training the apprentice so that he is capable of checking up on the machining operations. Training men to make molds is just one part of the foundry industry.

It is important, Mr. Gregory explained, that foundrymen know what kind of wood to use in making patterns, but it is just as important for him to take a blueprint and draw lines to show where the partings and cores are going to be located. He should have a knowledge of chemistry and metallurgy, and of core oils. We can make molds by machines, the speaker asserted, but we require brains to set up these machines.

Applications Run High

Both apprentice training and foreman training were considered in a second session. Both subjects were dealt with in a paper by A. R. Leubke, Fairbanks, Morse & Co., Beloit, Wis. Speaking of apprentices, he pointed out that his company limits training to high school graduates of good character and personal habits who have been recommended by the principal or superintendent.

No difficulty has been encountered, he said, in obtaining twice as many applications as could be accepted, and apprentice training in the long run is profitable to both the company and the apprentice.

Discussing a foundrymen's approach to foreman training, W. G. Conner Jr., Walworth Co., Greensburg, Pa., outlined a two-year foremanship training course operated by his company.

Low-Price Orders Boost Production

Upturn Accompanied By Slight Improvement In Sentiment

MARKET IN TABLOID ★

Demand
Generally steady; sheet an strip releases awaited.

Prices
Untested in some instances scrap stronger.

Production
Increased 2½ points to 4 per cent.

■ A MODERATELY better tone pervades steel markets despite the realization by producers that unprofitable business largely is responsible for the quickening in activity.

Steelmaking moved up 2½ points last week to 48 per cent, first increase in 12 weeks. In some districts the upturn is attributed more to a general rise in demand than to the recent bulge in low-price orders for sheets and strip. Nevertheless, the latter tonnage is an important factor in expanding operations in most leading areas. Stronger scrap markets accompany the gain in output.

Shipment of a large portion of flat-rolled steel booked lately will be deferred until next quarter, consequently ingot production will be supported for an extended period by this business. New buying will be retarded equally as long, and a test of current prices awaits the absorption of material now on order.

Resumption of coal mining is reflected to a certain extent in steel plant schedules, principally in better operations among blast furnaces and coke ovens. Some railroad shops also have reopened, but the effect on steel demand generally is slight.

Freight car inquiries continue scant. Recent locomotive buying includes 20 switchers ordered by three roads. May freight car awards totaled 1000, against 3095 in April and 6014 a year ago. Orders to date this year are 5 per cent ahead of the 1938 period.

Conditions Today Partly Resemble Those Year Ago

In the absence of any significant improvement in steel requirements of large consumers, such as railroads, building construction and the automobile industry, recovery in steelmaking during the immediate future appears likely to be restricted. Hopes that the subsequent trend will parallel that of last year's second half are based partly on the similarity of certain conditions today and a year ago.

Ingot production at this time in 1938 was 28.5 per cent. Output started to expand early in June, but demand did not receive the stimulus of lower prices until late that month. Like today, inventories were low, and this contributed to the steady rise in output the ensuing five months.

Warehouses have followed mills in establishing lower base prices on sheets, strip and bars. In some districts reductions also embrace plates and shapes.

Producers' quotations are reasonably steady, though partly because there is insufficient new business to test some of them. Concrete reinforcing bar prices remain highly unsettled, particularly in the East. Pig iron producers this week are expected to reaffirm current prices for third quarter.

Body Plant Strike Reduces Auto Output to Year's Low

A body plant strike crippled assemblies of the Chrysler Corp. last week, accounting for practically all the drop of more than 12,000 units in automobile production. The total of 67,740 units compares with 45,120 a year ago. Output by other interests was steady, but this week is expected to see more general curtailment because of extended holiday shutdowns.

Steel releases for production of new models so far are light but will increase shortly, principally from parts companies. Dealer stocks of current models continue ample in relation to retail demand, despite slightly better sales this month, and expectations are for a further reduction in assemblies in June.

Awards of fabricated structural shapes and concrete reinforcing bars recently have held below the average for the year to date. This reflects passing of the peak in contracts for public works and inability of private construction to make up the difference. Substantial tonnages remain to be shipped against old contracts.

Seven districts accounted for last week's rise in steelmaking. Pittsburgh was up 3 points to 36 per cent and Chicago 3½ points to 49. Other increases included 3 points to 45 at Youngstown, 4 points to 54 at Cleveland, 3 points to 59 at Wheeling, 4½ points to 42 at Buffalo and 8 points to 52 at Cincinnati. Detroit was down 2 points to 57. Unchanged centers were eastern Pennsylvania at 37, Birmingham at 57, New England at 45 and St. Louis at 39.

Scrap is stronger at Pittsburgh and Chicago. A small price increase in the latter market boosted the scrap price composite 4 cents to $14. The finished steel composite holds at $55.70.

COMPOSITE MARKET AVERAGES

	May 27	May 20	May 13	One Month Ago Apr., 1939	Three Months Ago Feb., 1939	One Year Ago May, 1938	Five Years Ago May, 1934
Iron and Steel	$35.63	$35.63	$35.72	$36.34	$36.37	$38.50	$32.97
Finished Steel	55.70	55.70	56.10	56.50	56.50	61.70	54.80
Steelworks Scrap..	14.00	13.96	14.12	14.64	14.87	11.47	11.30

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	May 27, 1939	April 1939	Feb. 1939	May 1938
Steel bars, Pittsburgh	2.15c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.15	2.25	2.25	2.50
Steel bars, Philadelphia	2.47	2.57	2.57	2.77
Iron bars, Terre Haute, Ind.	2.05	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.00	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.05	3.20	3.20	3.45
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.00	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.05	3.20	3.20	3.25
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	May 27, 1939	April 1939	Feb. 1939	May 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.34
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.34
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.33	85.33	85.27	107.77

Scrap

Heavy melting steel, Pittsburgh	$14.25	$15.50	$15.65	$11.55
Heavy melt. steel, No. 2, E. Pa.	12.75	13.65	13.25	10.25
Heavy melting steel, Chicago	12.75	13.35	14.00	11.05
Rails for rolling, Chicago	17.25	17.25	17.25	14.85
Railroad steel specialties, Chicago	14.75	15.35	16.00	13.60

Coke

Connellsville, furnace, ovens	$3.75	$3.75	$3.75	$4.25
Connellsville, foundry ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.00c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 20 tons)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 15 to 50 tons)

Pittsburgh	2.00c
Chicago or Gary	2.00c
Detroit, delivered	2.10c
Cleveland	2.00c

Buffalo	2.00c
Birmingham	2.00c
Gulf ports	2.35c
Pacific Coast points	2.60c

Iron

Chicago, Terre Haute	2.05c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.80; two-point cattle, 80-rod spool	$2.62
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carloads, Pittsburgh.....$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot-rolled, 1 to 20 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve.,	Pitts.
0.26—0.50	2.80c	
0.51—0.75	4.30c	
0.76—1.00	6.15c	
Over 1.00	8.35c	

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞—1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller 67.5 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	70.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
½-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2½" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.06
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Terre Haute, del.	10.00
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$22.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	17.00-18.00
Do. barge	18.00-19.00
No. 2 lump	18.00-19.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00
Do., del. Pittsburgh 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00
2% carbon, 93.00; 1%, 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c
67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.00
Do, smaller lots 2.10

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do, 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c
Ton lots 5.00c
Less-ton lots 5.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

—The Market Week—

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.88	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.61
New York (Metropolitan)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.43
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	....	3.85	3.85	5.20	3.90	....	5.40
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.40
Pittsburgh	3.25	3.60	3.60	3.40	3.40	5.00	3.35	4.45	4.50
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.55	4.62
Detroit	3.33	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.59
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	....	4.57
Chicago	3.50	3.75	3.75	3.55	3.55	5.15	3.35	4.30	4.25
Minneapolis	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	4.50
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	3.32	4.53
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.54	4.64	4.64	4.41	4.41	6.01	4.32	....	5.29
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	3.65	3.85	5.20	3.40	3.50	5.25	3.95	....	4.75
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	4.75
San Francisco	3.65	4.05	6.00	3.60	3.60	5.20	3.60	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	3100
Boston	3.46	4.13	4.18	7.50	6.05	5.80	7.90	8.63	7.23
New York	3.51	4.09	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.06	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.10	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.20	....	....	....	....	....	....	....
Buffalo	3.42	3.75	3.75	7.10	5.65	5.40	8.50	8.15	6.75
Pittsburgh	3.35	3.65	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.20	3.75	3.30	7.30	5.85	5.85	7.70	8.15	6.75
Detroit	3.40	3.80	3.38	7.42	5.97	5.72	7.19	8.45	7.05
Cincinnati	3.45	4.00	3.65	7.44	5.99	5.74	8.84	8.50	7.10
Chicago	3.65	3.75	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.34	3.90	7.45	6.00	8.59	9.19	8.84	7.44
Milwaukee	....	3.93	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.02	3.92	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	..	4.36	....	....	....	....	....	....	....
Chattanooga	....	4.44	....	....	....	....	....	....	....
Tulsa, Okla.	....	4.79	....	....	....	....	....	....	....
Birmingham, Ala.	.	4.48	....	.	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.00	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, May 25

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$18.32	2 3 0
Basic bessemer	....	17.15	2 0 3
Hematite, Phos. .03-.05	26.91 5 15 0*	.....	.....
Billets	$34.52 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.24 11 7 6	42.60	5 0 0
Standard rails	$44 46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.95c to 1.98c	5 2 6 to 5 4 0
Structural shapes	2.09c 10 0 0	1.76c to 1.85c	4 12 6 to 4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.95c	7 15 0°
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.52c	9 5 0
Bands and strips	2.77c 13 5 0	1.95c to 2.00c	5 2 6 to 5 5 0
Plain wire, base	4.08c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	....	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17	4 19 0(a)	$16.61	626.75	$17.00	500	$25.28 63
Basic bess. pig iron	21.65	4 12 6(a)	.....	....	.....	...	27.89 (b) 69.50
Furnace coke	5.38	1 4 2	5.96	225	6.87	202	7.62 19
Billets	34.52	7 7 6	25.04	945	29.24	860	38.73 96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c 132
Merchant bars	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c 110
Structural shapes	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c 127
Sheets, black	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c	17 5 0	3.30c	2,750	4.13c	2,750	6.66c 370
Plain wire	4.08c	19 10 0	1.74c	1,450	2.48c	1,650	3.11c 173
Bands and strips	2.58c	12 7 0††	1.61c	1,340	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Grosstons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, No. 1, R. R.	13.50-14.00
Buffalo, No. 1	13.00-13.50
Buffalo, No. 2	11.00-11.50
Chicago, No. 1	12.50-13.00
Chicago, auto, no alloy	11.25-11.75
Chicago, No. 2 auto	10.50-11.00
Cincinnati, dealers	10.50-11.00
Cleveland, No. 1	13.75-14.25
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	9.00- 9.50
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	11.50-12.00
Granite City, R. R.	11.50-12.00
Granite City, No. 2	10.50-11.00
Los Angeles, No. 1	12.50-13.50
Los Angeles, No. 2	11.00-11.50
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	15.50-16.00
Pittsburgh, No. 1	14.00-14.50
Pittsburgh, No. 2	12.50-13.00
St. Louis, R. R.	12.00-12.50
St. Louis, No. 2	10.50-11.00
San Francisco, No. 1	13.00-13.50
Seattle, No. 1	11.00-12.00
Toronto, dirs. No. 1	9.25- 9.75
Valleys, No. 1	15.00-15.50

COMPRESSED SHEETS

Buffalo	11.00-11.50
Chicago, factory	12.00-12.50
Chicago, dealers	10.75-11.25
Cincinnati dealers	10.00-10.50
Cleveland	13.75-14.25
Detroit	10.25-10.75
E. Pa., new mat.	15.00-15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	14.00-14.50
St. Louis	9.50-10.00
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	10.00-10.50
Cleveland	9.50-10.00
Los Angeles	14.00
Pittsburgh	12.50-13.00
St. Louis	7.00- 7.50
Toronto, dealers	8.00- 8.50

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati, dealers	6.00- 6.50
Detroit	7.00- 7.50
†Los Angeles	3.75- 4.00
St. Louis	6.00- 6.50
Toronto, dealers	4.25- 4.75

BUSHELING

Buffalo, No. 1	11.00-11.50
Chicago, No. 1	11.25-11.75
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	1.75- 2.25
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	9.50-10.00
Valleys, new, No. 1	14.00-14.50
Toronto, dealers	3.75- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.00- 6.50
Chicago	6.50- 7.00
Cincinnati, dealers	4.00- 4.50
Cleveland	7.00- 7.50
Detroit	4.25- 4.75
Eastern Pa.	8.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	8.00- 8.50
St. Louis	3.50- 4.00
Toronto, dealers	4.25- 4.75
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.25- 7.75
Cleveland	7.50- 8.00
Chicago	7.50- 8.00
Detroit	5.25- 5.75
Pitts., alloy-free	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	6.75- 7.25
Cincinnati, dealers	2.75- 3.25
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	4.75- 5.25
New York	†2.50- 3.00
Pittsburgh	7.50- 8.00
Toronto, dealers	3.50- 4.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	12.50-13.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	4.00- 4.25

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†4.50
Buffalo	6.75- 7.25
Chicago	6.25- 6.75
Cincinnati, dealers	2.75- 3.25
Cleveland	7.50- 8.00
Detroit	4.75- 5.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.75- 4.25

RAILROAD SPECIALTIES

Chicago	14.50-15.00

ANGLE BARS—STEEL

Chicago	15.00-15.50
St. Louis	13.00-13.50

SPRINGS

Buffalo	15.50-16.00
Chicago, coil	15.50-16.00
Chicago, leaf	14.50-15.00
Eastern Pa.	17.00-17.50
Pittsburgh	17.00-17.50
St. Louis	14.00-14.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	16.50-17.00
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, dealers	16.25-16.75
Detroit	16.00-16.50
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.00-18.50
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	15.50-16.00
Chicago	13.00-13.50
Cleveland	16.00-16.50
Pittsburgh	15.50-16.00
St. Louis	13.00-13.50
Seattle	16.00

FROGS, SWITCHES

Chicago	12.50-13.00
St. Louis, cut	13.00-13.50

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	7.50- 8.00
Cincinnati, dealers	6.00- 6.50

RAILROAD GRATE BARS

Buffalo	9.00- 9.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.75- 6.25
Eastern Pa.	12.50
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.00-16.50
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	11.50-12.00

FORGE FLASHINGS

Boston district	†7.50- 8.00
Buffalo	11.00-11.50
Cleveland	11.00-11.50
Detroit	8.50- 9.00
Los Angeles	9.00
Pittsburgh	12.50-13.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Cleveland, crops	17.50-18.00
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.00-18.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Eastern Pa., crops	17.50-18.00
Pittsburgh	17.00-17.50
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Boston district	†15.00
Chicago, net	17.50-18.00
Eastern Pa.	20.50-21.00
St. Louis	17.00-17.50

LOCOMOTIVE TIRES

Chicago (cut)	15.00-15.50
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.25-15.50
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	15.50-16.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†10.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.00-13.50
Chicago, rolled steel	14.25-14.75
Cincin., iron, deal.	12.00-12.50
Eastern Pa., iron	15.50-16.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	17.00-17.50
St. Louis, iron	14.00-14.50
St. Louis, iron	14.00-14.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	13.00-13.50
Buffalo, mach.	14.00-14.50
Chicago, agri. net	9.50-10.00
Chicago, auto net	12.00-12.50
Chicago, railroad net	10.50-11.00
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	11.50-12.00
Cleveland, mach.	16.50-17.00
Detroit, cupola, net	12.50-13.00
Eastern Pa., cupola	16.00-16.50
E. Pa., mixed yard	13.50-14.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	14.50-15.00
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.50-15.00
Toronto, No. 1, mach., net	12.00-12.50

HEAVY CAST

Boston dist. break.	†9.50
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	12.50-13.00
Detroit, auto net	12.50-13.00
Detroit, break	9.50-10.00
Eastern Pa.	14.50-14.75
Los Ang., auto, net	13.00-13.50
New York, break	†10.50-11.00
Pittsburgh, break	12.00-12.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	11.50-12.00
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.75- 6.25
Detroit, net	7.00- 7.50
Eastern Pa.	12.50
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	8.00- 8.50

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	11.50-12.50
Buffalo	13.50-14.00
Chicago, R. R.	14.50-15.00
Cincin., agri., deal.	10.25-10.75
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	15.00-15.50
St. Louis, R. R.	12.25-12.75

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	10.00-10.50
Tungsten, sh. ton unit, duty pd. nom.	19.00-19.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	29.00
So. African, 50-52% nom.	29.00
Indian, 49-50%	27.00-28.00

Sheets, Strip

Sheet and Strip Prices, Page 68, 69

Pittsburgh—Sheet and strip specifications are relatively light despite substantial mill backlogs, since automobile builders are not ready to release material for new models. However, some partsmakers are reported ready for first placements. Miscellaneous demand is moderately heavier, and production of both sheets and strip has been increased slightly. Output of galvanized sheets is in a seasonal slump, being off 1 point to 55 per cent.

Cleveland—Sheet and strip production is slow to reflect the sharp increase in bookings lately, since delivery of much of this tonnage will be deferred until next quarter. Recently announced prices on hot and cold-rolled material are provided little test by the small volume of business left in the market. Mills profess to be adhering to the 3.50c base on galvanized sheets, but this market remains to be established.

Chicago—Sheet and strip producers are inclined to minimize the tonnage booked at recent concessions. Nevertheless, backlogs were swelled appreciably and this has been followed promptly by an upturn in mill operations. New business is quieter.

Boston—Except for business from warehouses, sheet coverage at recent concessions is relatively light. Prices are now steadier, with buying somewhat slower. Tonnage being released by warehouses is lower, but direct buying by industrial consumers is steady in small lots for prompt shipment.

Prices have steadied, but cold strip buying has not improved. Consumers continue to purchase mostly in line with current consumption. Small backlogs held by eastern producers indicate coverage at low prices recently was light. Finishing operations average 50-55 per cent.

New York—Following recent protective covering by consumers at sharp concessions, sheet business here is light, a condition thought likely to prevail for some time. In absence of important test, prices appear to be holding at recently announced levels.

Some price shading continues in low-carbon strip. High-carbon material is steadier.

Philadelphia—Sheet demand is practically non-existent, and no further test of prices is expected for several months. Galvanized sheets, recently selling $4 to $6 below published levels, are steadier. Sheet consumption is sustained, although stove manufacturing has moderated.

Buffalo—The market has quieted with passing of the price cutting period. Producers took considerable tonnage but are heartened by the fact not much business was booked at the maximum concessions. Production increased last week on better automotive demand.

Cincinnati—New business has tapered since the period of price concessions, while shipments show little change Attempts to strengthen the market have been fairly successful in this district. Despite reported irregularity in galvanized sheets, demand has not increased.

St. Louis—Sheet and strip prices are steadier, but demand now is quiet, following recent extensive coverage by consumers. Enameling stock is moderately active, stove and household appliance makers being best outlets. Galvanized roofing is slow.

Birmingham, Ala.—Sheets retain relatively good activity, at about 65 per cent, according to unofficial estimates. Roofing continues somewhat ahead of manufacturers'

FROM ORE TO METAL

The Story of St. Joe Electro-Thermic Zinc—Number 3 of a Series

THE DRILLMAN

One of the key men in mining is the drill runner, with a keen eye for pay ore, a strong arm for controlling his throbbing machine, and an experienced knowledge for the proper placing of holes to ensure the maximum rock tonnage broken for the minimum of time and dynamite consumed.

Two hoses connect with his drill, one for the compressed air for power, the other supplying dust-preventing water.

He works 500 to 2,000 feet underground in a temperature of 60° F. On the surface it may be a stifling summer day, or 35° below zero, as it was one morning in January 1939.

He drills, loads his holes and fires (blasts) them, in the Edwards and Balmat zinc mines of the St. Joseph Lead Company in northern New York State. From here the concentrates are shipped to the Company's smelter at Josephtown, Pa., for conversion into the new electrothermic Highgrade, Intermediate and Prime Western grades of St. Joe Zinc.

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sheets. A slight increase is noted in strip output.

Plates

Plate Prices, Page 68

Chicago—Plate demand is fairly active, aided by requirements for freight car building and repairs, bridge construction and miscellaneous purposes. The last-named outlet has been more active lately. Prices are steadier.

Boston—Shipyard releases are steady, but not widely distributed among producers except by navy yards, contracts for which are placed through open bidding. Other consumers are buying sparingly, including railroads, structural and boiler shops. Tank and specified work is slack. Comparatively little advance tonnage is on mill books. While less prevalent, price shading has not entirely disappeared.

Philadelphia—Miscellaneous plate buying is well sustained, while larger consumers, including railroads and shipbuilders, remain out of the market. Price concessions are disappearing, railroad orders being placed at the full 2.10c Claymont base. However, some weakness still prevails in light tank plates in strip mill gages.

Birmingham, Ala.—Plates are in somewhat better demand. Considerable tonnage should be available before the end of the quarter, when contracts are placed for shipbuilding materials.

Seattle—Plates are the least active of major steel items, with buying confined to lots of less than 100 tons for boilers, tanks and smokestacks. Largest project pending, about 1250 tons, is for the Mud Mountain flood control project, Washington state, bids for which will probably be called next month by United States engineer, Seattle.

San Francisco—Awards and inquiries for plates are in lots of less than 100 tons and little new work is in sight. Awards to date total 16,480 tons, compared with 14,046 tons for the same period last year.

Plate Contracts Placed

1200 tons, large diameter steel pipe, Elwood, Nebr., to Chicago Bridge & Iron Co., Chicago.

700 tons, Coulee dam pipe and fittings, reported to Grimes Pipe & Supply Co., Denver, low bidder.

675 tons, 30-inch steel water pipe, Washington Suburban Sanitary District, Hyattsville, Md., to American Locomotive Co., Dunkirk, N. Y.

145 tons, steel barge, Pennsylvania Water & Power Co., Holtwood, Pa., to Lancaster Iron Works, Lancaster, Pa.

Plate Contracts Pending

700 to 1000 tons, bureau of supplies and accounts, Washington, for delivery to Norfolk, Va., navy yard; bids June 1.

200 tons, bureau of supplies and accounts, Washington, for Pearl Harbor, T. H.; bids June 6.

Bars

Bar Prices, Page 68

Cleveland—Demand is maintained, not having been influenced markedly by recent price revisions. However, some disapproval has been expressed by large users of the elimination of quantity deductions, and a test of the market still is awaited. Only a small amount of business so far is traceable to preliminary work on new automobile models.

Chicago—Merchant bar demand shows little improvement. Farm and industrial tractor builders continue a leading outlet. Some automotive tonnage also has been booked, but substantial buying in that direction has yet to appear.

Boston—Improvement in merchant bar buying has been slight since recent price adjustments. Most tonnage in this district is distributed by secondary sellers and some are dissatisfied with elimination of quantity deductions, though the majority of buyers benefit. Alloy bar releases are fairly steady in small lots, although not apparently influenced by changes in quantity deductions. Demand for forging material has slackened slightly. Cold finished buying is barely held.

For Boston navy yard, bids open at Washington, June 1, under schedule 6350 on 178,800 pounds, nickel, molybdenum and vanadium steel bars. Bids close the same date on 150 tons of bars and strip for Norfolk, Va., schedule 6336.

New York—While too early for much of a test, recently announced bar prices appear to be holding. Demand is light, due partly to previous forward covering. Railroad shops are more active since settlement of the coal dispute, but bar demand from that direction has improved little.

Philadelphia—Large bar consumers are dissatisfied over the net increase of $1 in prices, but no test of the market is expected before late June. The old price continues until July 1. Bar consumption is fairly steady. Farm equipment builders have experienced a sharp rise in business this month, but the outlook is less promising.

Birmingham, Ala.—Demand for bars is bolstered mainly by concrete reinforcing, a large tonnage of which has come out within the past 10 days. Disappointment over needs of agricultural implement makers is evident.

Pipe

Pipe Prices, Page 69

Pittsburgh—Restricted demand from oil well drillers continues to hold down activity in steel pipe, although standard pipe business is sustained. Consigned stocks of the latter are moving fairly well. Boiler tubes are in better demand from railroads though somewhat below expectations.

Cleveland—Cast iron pipe inquiries and orders have moderated the past few weeks, and the outlook is for a quieter market into the summer. Government-financed work largely is under contract now, this contributing to a falling off in inquiries, while private capital is slow to appear. Standard pipe demand is steady, with oil country goods relatively slow.

Chicago—Cast pipe is quiet. PWA requirements have been exhausted, although scattered demand appears for WPA work. Private business is slow. Chicago recently closed on 700 tons.

New York—While four foundries shared in award of 14,000 tons of cast pipe for New York city yard stocks, most went to United States Pipe & Foundry Co. Small-lot purchasing is slightly heavier, notably for Long Island and New Jersey, largely through contractors. Few large tonnages are being placed. Utilities are buying sparingly.

Birmingham, Ala.—Improvement noted several weeks ago in cast iron pipe production continues. The upturn is moderate, however, and bookings are mostly in relatively small quantities.

Seattle—Inquiry has quickened and several sizable projects are developing. Tonnages pending are largest in several months. Yakima, Wash., has approval of a $307,759 WPA allotment and opened bids May 22 for materials, including about 1200 tons of cast iron pipe. Award is still pending for 325 tons, 2 to 8-inch cast iron for the Bethel district, Eugene, Oreg., H. G. Purcell, Seattle, low.

San Francisco—Demand for cast iron pipe has improved considerably and pending business now calls for more than 5000 tons. The east bay municipal utility district, Oakland, Calif., has called for bids to be opened May 31 for the second largest inquiry of the year, 1750 tons of 2 to 20-inch pipe. Awards aggre-

gated 795 tons and brought the total to date to 11,254 tons as compared with 10,746 tons for the corresponding period in 1938.

Cast Pipe Placed

775 tons, 12-inch, Los Angeles; divided between American Cast Iron Pipe Co. and National Cast Iron Pipe Co., both of Birmingham, Ala.

Cast Pipe Pending

1750 tons, 4 to 20-inch, east bay municipal utility district, Oakland, Calif.; bids May 31.

700 tons, Garfield street improvement, Seattle, 8 to 16-inch; bids in.

400 tons, alternate transite, Port Angeles, Wash.; bids in.

390 tons, 2 to 10-inch, South Pasadena, Calif.; bids opened.

375 tons, 4 and 6-inch, Inglewood, Calif.; bids June 6.

160 tons, 6-inch, Spokane, Wash.; H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J., low.

Wire

Wire Prices, Page 69

Pittsburgh — Wire orders are spotty. Little change is indicated for the near future, and producers expect a quiet market during the summer. Demand for merchant products is light and competition is keen even on smaller orders. Prices of the latter are fairly steady, although weakness prevails in certain localities on some items.

Cleveland—Changes in wire and merchant products demand lately have been slight. Some business for new automobile models is appearing, but large tonnages are not due for a number of weeks. Outlook for business in merchant products is somewhat unfavorable in view of a lag in resale trade in some districts compared with a year ago.

New York—Some scattered wire orders are appearing from automotive interests, but the bulk of tonnage required for new models is not expected to be released for several weeks. Demand otherwise is steady, with specialties slightly more active. May volume was a trifle ahead of April. Prices are fairly steady.

Birmingham, Ala.—Wire production holds at approximately 60 per cent, it is estimated, and is next in output to sheets.

San Francisco—Demand for wire products is holding up well but orders, for most part, are relatively small tonnages. Bureau of reclamation will open bids May 31 for 275 tons of ⅝ to 7/16-inch seven and three wire double galvanized strand, under invitation 44,337-A-1 for delivery at Parker, Ariz.

Rails, Cars

Track Material Prices, Page 69

Carbuilders estimate May bookings at about 1000 freight cars, against 3095 in April. The total so far this month is 976 cars but with only two working days left and little inquiry active this is not likely to be increased materially.

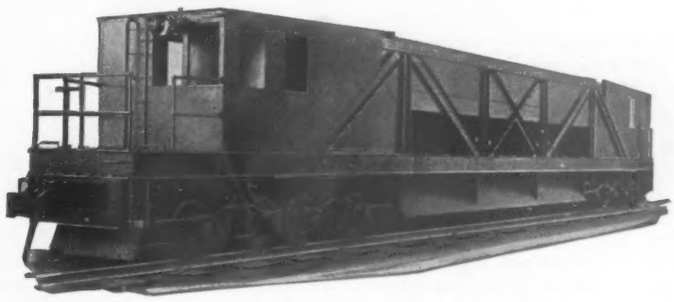
Federal court has approved the recent purchase by the Denver & Rio Grande Western of 550 freight cars from Pressed Steel Car Co., McKees Rocks, Pa. Birmingham Southern has placed 100 hoppers and 10 flats with Pullman-Standard Car Mfg. Co. Electro-Motive Corp., La Grange, Ill., has booked 20 diesel switchers for Great Northern, Chicago, Burlington & Quincy and Pere Marquette.

Locomotives Placed

Chicago, Burlington & Quincy, five 600-horsepower diesel switchers, to Electro-Motive Corp., La Grange, Ill.

Great Northern, fourteen 1000-horsepower diesel switchers, to Electro-

ATLAS ORE TRANSFERS



100 ton—3 compartment Ore Transfer. Roller Bearing Journals. Double end control for car operation. Individually operated discharge gates.

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THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Motive Corp., La Grange, Ill.

Pere Marquette, one 600-horsepower diesel switcher, to Electro-Motive Corp., La Grange, Ill.

Car Orders Placed

Birmingham Southern, 100 hoppers and 10 flat cars to Pullman-Standard Car Mfg. Co., Chicago.

Buses Booked

American Car & Foundry Motors Co., New York: Five for Biddeford & Saco Railroad, Biddeford, Me.; three for Boston, Worcester & New York Street Railway, Framingham, Mass.; one for Campus Travel Inc., New York; one for Quaker City Bus Co., Ocean City, N. J.; two for Maine Central Transportation Co., Portland, Me.

Shapes

Structural Shape Prices, Page 68

Pittsburgh—Awards continue to hold up well and new inquiries are also more numerous.

Cleveland—Private work is light and there is little prospect of any improvement soon. Mt. Vernon Bridge Co., Mt. Vernon, O., is low on 2500 tons for the superstructure to the Erie avenue bridge, Lorain, O. Another section of the Cuyahoga river straightening project closes June 1. A number of bridge jobs in Youngstown and here, involving considerable tonnage, should come out for bids soon. No improvement in price is noted.

Chicago — Outstanding pending project involves 2400 tons for a viaduct over the Rock Island tracks, Blue Island, Ill.; Thomas McQueen Co., Forest Park, Ill., is low. Although numerous small jobs have been awarded recently, and many substantial tonnages are still awaiting disposition, the market is definitely quieter.

Boston—Contractors have closed on 1225 tons, bridge needs in Vermont, most being I-beam spans going to American Bridge Co., Pittsburgh. Inquiry in other directions is slightly heavier, notably for steel sheet piling for flood control work, Springfield, Mass., and East Hartford, Conn., 3000 tons, on which general estimates are in. Little shop fabrication is required for current bridges being placed. Prices on fabricated material are easy.

Philadelphia — Smaller structural shops are badly in need of work since volume of construction, alteration and repair jobs usually handled by these shops are extremely disappointing. Some of the larger interests are about 50 per cent occupied. Prices remain weak.

Buffalo — Demand is moderately encouraging. The Buffalo Structural Steel Co. booked 800 tons for the Kleinhans music hall, Buffalo. Awards are awaited on the new convention hall and Commodore Perry housing project here. An addition to the Elmira reformatory is up for bids June 1, involving 800 tons of shapes and bars.

Seattle—Largest project pending is the Ballard bridge, Seattle, 1508 tons of shapes and an unstated quantity of sheet piling, general contracts placed. Washington state receives bids June 6 for the Snohomish river bridge involving 550 tons. Plants have fair tonnages on hand, but no large projects have developed recently.

San Francisco—The sub-contract for 2250 tons of shapes and 799 tons of sheet steel piling for the Ballard bridge, Seattle, has been placed with Isaacson Iron Works. Bids have just been taken on 1455 tons for the Lewis river bridge in Clark and Cowlitz county, Washington. Awards aggregate 5161 tons and brought the total to date to 55,322 tons, compared with 44,826 tons last year.

St. Louis — Interest centers in prospective lettings involving about 3000 tons of shapes. However, actual placements are negligible, aggregating less than 400 tons. Operations at fabricating yards are slightly below 25 per cent of capacity, with backlogs diminishing.

Shape Contracts Placed

3049 tons, including 799 tons of sheet piling, Ballard bridge, Seattle, to Isaacson Iron Works, Seattle.

1900 tons, field house, Michigan state college, East Lansing, Mich., to R. C. Mahon Co., Detroit.

805 tons, Kleinhans music hall, Buffalo, to Buffalo Structural Steel Co., Buffalo.

663 tons, bearing piles, United States engineer office, proposal 215, to Columbia Steel Co., San Francisco.

600 tons, Great Lakes Carbon Corp., Niagara Falls, N. Y., to Bethlehem Steel Co., Buffalo.

570 tons, finishing plant, Chatham Mfg. Co., Elkin, N. C., to Bethlehem Fabricators Inc., Bethlehem, Pa.

520 tons, freight terminal, New York Central railroad, Twelfth avenue, New York, to American Bridge Co., Pittsburgh.

450 tons, state bridge, Jackson street, St. Paul, to Bethlehem Steel Co., Bethlehem, Pa.

370 tons, six I-beam bridges, Grafton, Vt., to American Bridge Co., Pittsburgh; W. G. Brown, Schoharie, N. Y., general contractor; bids April 21.

310 tons, sanitation garage, Georgia avenue, Brooklyn, to Bethlehem Steel Co., Bethlehem, Pa.; through procurement division, treasury department, New York.

300 tons, additions and alterations, Columbia Broadcasting Co., 49 East Fifty-second street, New York, to Lehigh Structural Steel Co., Allentown, Pa.

300 tons, apartments, for Elizabeth housing authority, Elizabeth, N. J., to Lafayette Iron Works.

300 tons, apartments, Wynnewood Park Corp., Wynnewood, Pa., to Belmont Iron Works, Eddystone, Pa.

300 tons, state bridge, FAGH-305-C, Center Grove, Iowa, to Clinton Bridge Co., Clinton, Iowa.

267 tons, sheet piling, United States engineer office, proposal 217, Los Angeles, to Bethlehem Steel Co., Los Angeles.

265 tons, foundry building, J. P. Ward Co., Blossburg, Pa., to Milton Steel Co., Milton, Pa.

260 tons, truss bridge, West Dubuque, Iowa, to Clinton Bridge Co., Clinton, Iowa.

245 tons, service building and garage, Queens tunnel, Long Island City, N. Y., to Harris Structural Steel Co., New York.

240 tons, bridge over Shetucket river, Norwich, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

227 tons, Texas state highway department, to Austin Co., Cleveland.

225 tons, bridge, over Shetucket river, Willimantic, Conn., for town of Windham, Conn., to American Bridge Co., Pittsburgh.

223 tons, two I-beam bridges, Marlboro-Newfane, Vt., to American Bridge Co., Pittsburgh; W. G. Brown, Schoharie, N. Y., general contractor; bids April 21.

217 tons, 3-span I-beam bridge, Bennington, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; Bennington Construction Co., Bennington, Vt., general manager.

200 tons, sheet piling, Puget Sound graving dock, to Bethlehem Steel Co., Seattle.

195 tons, bridge WPSS-11553-B2, Grundy, Va., to Virginia Bridge Co., Roanoke, Va.

180 tons, heating plant, for Connecticut state college, Storrs, Conn., to Haarmann Steel Co., Holyoke, Mass.

175 tons, viaduct over Missouri Pacific railroad, Ralston, Nebr., for state, to International Steel Co., Evansville, Ind.

165 tons, three I-beam bridges, Guilford-Halifax, Vt., to American Bridge Co., Pittsburgh; W. G. Brown, Schoharie, N. Y., general contractor; bids April 21.

150 tons, grade and high school, Katonah, N. Y., to Weatherly Structural Steel Co., New York.

150 tons, store, Kresge Co., Wilmington, Del., to Belmont Iron Works, Philadelphia.

150 tons, theater, Wildwood, N. J., to Bel-

Shape Awards Compared

	Tons
Week ended May 27	**14,923**
Week ended May 20	**11,337**
Week ended May 13	**34,765**
This week, 1938	**6,550**
Weekly average, year, 1938	**21,566**
Weekly average, 1939	**23,280**
Weekly average, April	**24,531**
Total to date, 1938	**326,905**
Total to date, 1939	**465,607**

Includes awards of 100 tons or more.

mont Iron Works, Philadelphia.

147 tons, 3-span I-beam bridge, Huntington, Vt.; two I-beam bridges, Whitingham, Vt., and one I-beam, Springfield. Vt., to American Bridge Co.; W. W. Wyman Inc., Shelburne Falls, Mass.; Lane Construction Corp., Meriden, Conn., and R. J. Pierce, Brattleboro, Vt., respective contractors.

140 tons, refuse plant, West Frankfort, Ill., to Pan-American Bridge Co., New Castle, Ind.

135 tons, bridge FAS-16A, Warren county, Tennessee, to McCann-Nabors Steel Co.

115 tons, Arlington high school, Poughkeepsie, N. Y., to Utica Structural Steel Co., Utica, N. Y.

115 tons, underpass FAGH-137F, North Dakota, to Minneapolis-Moline Power Implement Co., Minneapolis.

100 tons, three I-beam bridges, Huntington-Bolton and Hinesburg, Vt., to American Bridge Co., Pittsburgh; Lockwood-Young Corp., Concord, N. H., general contractor.

100 tons, Queens plaza, Mid-town tunnel, New York, to American Bridge Co., Pittsburgh.

100 tons, bridge 1542, Marion county, West Virginia, to Fort Pitt Bridge Works, Pittsburgh.

Shape Contracts Pending

6000 tons, viaduct, Shore road, Brooklyn.

2500 tons, superstructure, Erie avenue bridge, Lorain, O.; Mt. Vernon Bridge Co., Mt. Vernon, O., low.

2500 tons, nurses' home, medical center, Jersey City, N. J., for Hudson county board freeholders.

2400 tons, viaduct over Rock Island tracks, Burr Oak avenue, Blue Island, Ill.; Thomas McQueen, Forest Park, Ill., general contractor.

1600 tons, roof framing, specification 1236, Grand Coulee power plant, Odair, Wash., for bureau of reclamation.

1500 tons, upper West Third street bridge, over Cuyahoga river, Cleveland; bids due June 15.

1500 tons, bridges, Westmoreland and Franklin counties, Pennsylvania, for Pennsylvania Turnpike commission.

1500 tons, six bridges, Oklahoma City, Okla.; bids in.

1455 tons, highway bridge, Woodland, Wash.; Cowlitz & Clark, general contractor.

1100 tons, bridge, Plum Beach channel, Brooklyn; bids June 5, department of parks, New York.

850 tons, state bridge over Raccoon creek, Bridgeport, N. J.

800 tons, incinerator plant, Pittsburgh, for city.

800 tons, highway bridges, state of Illinois; bids due June 2.

800 tons, gymnasium and auditorium, for Seton Hall college, South Orange, N. J.

800 tons, bridges, Bedford county, Pennsylvania, for Pennsylvania turnpike commission.

650 tons, airways terminal building, New York, for unknown owner.

610 tons, including machinery, Snohomish river, Washington, state bridge; bids at Olympia, June 6.

600 tons, state bridges, Cordova, Iowa.

550 tons, midget auto racing track, for Northern New Jersey Oil Co., Linden, N. J.

500 tons, grade crossing eliminations, Tottenville, N. Y., for Staten Island Rapid Transit Co.

500 tons, four highway bridges, Leavenworth, Kans.; Ottibger Bros., Leavenworth, low.

400 tons, addition to Elmira, reformatory, Elmira, N. Y.; bids June 1.

360 tons, three bridges, Morris county, New Jersey; bids June 1; includes 125 tons bars.

357 tons, three bridges, route 6, section 11A, Parsippany-Troy Hills and Montville townships, Morris county, New Jersey; bids June 9, E. Donald Sterner, state highway commissioner, Trenton. Work includes underpass at Bloomfield avenue and bridges, Rockway and Passaic river flood control.

350 tons, highway bridge, contract 341, Wawarsing, N. Y., for New York City.

350 tons, Klein memorial auditorium, Bridgeport, Conn.

250 tons, office building, for G. & C. Merriam Co., Springfield, Mass.

225 tons, warehouse and factory building, Montgomery Ward Co., Chicago Heights, Ill.; bids May 31.

200 tons, state bridge over Ammonoosuc river, Northumberland, N. H.

200 tons, apartments and garage, Trenton, N. J., for unknown owner.

200 tons, bridge, Northumberland, N. H.

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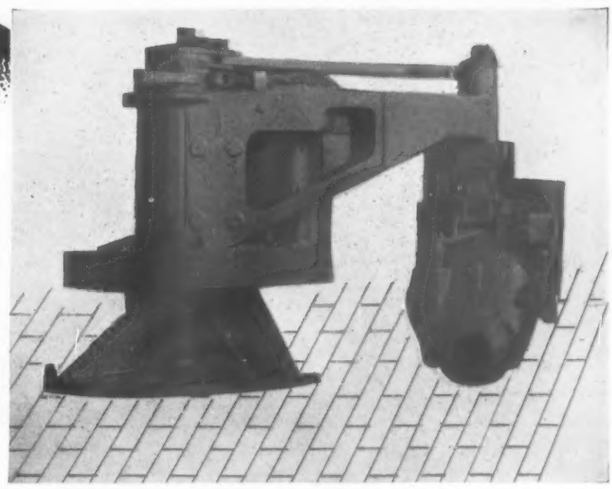
This new Pedestal Type Gun was recently put in service by a large southern steel plant. The gun proper, of the same design as the well proven Brosius gun widely used throughout the industry, is motor controlled with positive drive and constant speed. The 9 cu. ft. capacity is ample for any tapping hole and the cast steel crane is designed to give clear view and easy access at all times.



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Steam, Hydro-Electric, and Electric Mechanical Clay Guns, Hand and Motor Operated Goggle Valves, Flue Dust Conditioners, Blast Furnace Slag Granulating Machines, Single Hook Grab Buckets, Automatic Single Hoist Grab Buckets, Overhead and Auto Floor Charging Machines for serving Heating and Melting Furnaces, Auto Floor Manipulators for serving Steam Hammers, Presses, etc.

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Behind the Scenes with STEEL

Back Home and Safe

■ This week we can't even rhyme "candy is dandy but liquor is quicker" so don't be disappointed. With the roof of our mouth sunburned from upturned gapes at the Trylon, with our two oversized feet still burning, and with our cash position definitely on the rocky side, we can, however, toss a word or two your way that may not only entice you over to Mr. Whalen's big show but will also get you back in one piece and happy.

■ What a show it is. From the minute you plunk down six bits and pass through the turnstiles you will "oh" and "ah" until you are positive nothing else can get you excited and then you'll get in a dither all over again. With the first bar of *Sidewalks of New York* ringing constantly in your ears from the trick bus horns you will find the very best thing to do just as soon as you arrive is to hop on one of the 50 cent tours and take a fifty minute ride that you won't forget for yars and yars. Then you'll start to pick your spots.

■ You'll have Tony Sarg's map of the 1216½ acre layout by now and will be trying to find the Metals building while the wife asks one of those handsome police guides how far it is to Fashions and Cosmetics. Then there will be a slight skirmish and you'll compromise on the Lagoon of Nations, which won't be a mistake. There you will have such a selling job done on you as you never saw. From the stainless steel and marble Russian building (the most expensive on the grounds) to the quaint and beautiful Japanese pavilion you are constantly being sold a bill of goods. In the latter, you'll have to inquire several times to find the unballyhooed exhibit of machine gears made from compressed silk. We understand these self-lubricating, noiseless, and lightweight gears are in wide use in Japan today. You'll be duly impressed by the original Magna Charta in the British pavilion and decide it may be a bit expensive to try the terraced French restaurant, but by now you've heard about the top show of the fair and hop on your horse to get over to the Transportation section.

■ Unless you get there plenty early or are a personal friend of Mr. Sloan you'll have to wait to get into General Motors but wait by all means. This "fair within a fair" is beyond description. The Futurama ride of 15 minutes in a comfortable lounge chair through the 1960 of Norman Bel Geddes is the most impressive and thrilling thing we've ever done. If you go all the way to New York and do nothing else but this one thing you will be well repaid.

■ There are forty million other things that you will see, and it would take this whole issue of STEEL to do justice to a fraction of the "world's greatest temporary peace time business." All we can do is become another of Grover Whalen's self-appointed promoters and try to give you the urge to hie yourself over to the big city. It won't cost you much dough (the average family spends $8.00 a day including everything) and for yourself and your children it will be one of the most exciting and educational times of your life.

■ Just remember a couple of things. Plan on at least three or four days in order to see most of what you'll not want to miss, take along a comfortable pair of walking shoes and be sure to try one of those mouth-watering *crepes suzettes* with *grande marnier* which you can pick up at various spots around the grounds.

■ So, get the ol' jalopie greased, cash in that overdue insurance policy, get some one to stay with the baby and have a good time.

SHRDLU

—The Market Week—

200 tons, bridge, Leavenworth, Kans.; Geiger & Rutherford, Leavenworth, low.

175 tons, alterations and additions to assembly building, for Chevrolet Motor division of General Motors Corp., Norwood, O.

175 tons, building, for Globe Parking Stores Inc., Arlington county, Virginia.

167 tons, three I-beam bridges, Wilmington, Vt.; Rome Construction Co. Inc., Holden, Mass., low, $40,703.79, bids May 19, Montpelier.

165 tons, 3-span plate girder bridge, 286 feet 8 inches long, route 106, Perkinsville Village, Vt.; bids June 2, H. E. Sargent, commissioner of highways, Montpelier; also closing same day 74-foot I-beam span, route 115, Goshen-Brandon town line.

157 tons, N. Y. C. grade crossing, Lucas county, Ohio; Labartau Co., Toledo, O., low.

150 tons, Tuscarora mountain tunnel, Shady Gap, Pa., for Pennsylvania Turnpike commission.

150 tons, building for Montgomery-Ward Co., Meadville, Pa.

150 tons, addition to high school, Port Richmond, N. Y., for New York City.

125 tons, beam spans, Lake Leelanau, Mich., for state.

125 tons, bridge over Ottawa river, Lima, O., for Detroit, Toledo & Ironton railroad.

125 tons, completion A. C. hangar and annexes, Scott Field, Ill.

125 tons, resident hall for women, for University of Maine, Orono, Me.

120 tons, bridge, Wyoming county, Pennsylvania; bids in.

100 tons, 3-span I-beam bridge, Huntington, Vt.; W. W. Wymann Inc., Shelburne Falls, Mass., low, $24,442.53, bids May 19, Montpelier, Vt.

Unstated tonnage, framing for Coulee power plant; bids to reclamation bureau, Denver, June 2, Spec. 1236-D.

Unstated tonnage, piling, Cuyahoga river straightening project, contract 16, cut 3B; bids June 2.

Reinforcing

Reinforcing Bar Prices, Page 69

Pittsburgh — Prices are in fair shape, excepting the eastern seaboard and westetrn New York, where weakness as low as $1.50 per hundred pounds mill have been made. However, considerable activity is noted in the market without resort to price cutting. Tonnages are fairly large with placements active. New projects continue to come out in good numbers, although there are few private jobs.

Cleveland—Public work continues to lead. Sam W. Emerson Co., Cleveland, recently awarded 800 tons to Patterson Leitch Co., Cleveland, for the Valley View housing project, here. The Luna park housing project, 750 tons, closes June 2.

Local fabricators are fairly active on small tonnages recently booked for public school jobs, store fronts and other miscellaneous work. Prices remain weak.

Chicago — The market is unchanged, with demand well maintained in view of numerous projects actively pending. A substantial volume of small jobs continue to appear while several over 100 tons remain to be placed at an early date.

New York — Prices continue mixed and on the weak side, although another effort is being made to stabilize the price structure. In recent past such efforts have failed in competition for larger tonnages. Buying is slower and inquiry is featured by 1600 tons, East River drive, 54th to 64th streets, New York.

Philadelphia — Fabricators report a definite move to stiffen the market on deformed bars, which have been moving at concessions of $10 and more per ton. Low prices have made it impossible for some fabricators to quote on some jobs. Only a few jobs requiring large tonnages are up for bids.

Seattle—Pending work includes several sizable contracts including 1700 for the Seattle federal court house, 750 for the Ballard, Seattle, bridge and 400 tons for a flour mill at Spokane. The Mud Mountain dam, Washington state, bids to United States engineer, Seattle, probably in June, will require about 2500 tons.

San Francisco — Awards are heavy totaling 4521 tons, bringing the year's aggregate to 75,558 tons, compared with 40,907 tons a year ago. Soule Steel Co. booked 2850 tons for the parcel post building, San Francisco. The bureau of reclamation is calling for new bids on 967 tons for delivery at Pollock, Calif.

St. Louis—A fair number of small jobs have been placed totaling close to 400 tons. A large order was placed in the South, 2100 tons for a housing project, New Orleans, went to Connors Steel Co., Birmingham, Ala. Operations at local fabricating yards are approximately one-fourth of capacity.

Concrete Bars Compared

	Tons
Week ended May 27	**11,360**
Week ended May 20	**10,940**
Week ended May 13	**9,997**
This week, 1938	**5,609**
Weekly average, year, 1938	**6,959**
Weekly average, 1939	**11,155**
Weekly average, April	**9,494**
Total to date, 1938	**123,616**
Total to date, 1939	**223,109**

Includes awards of 100 tons or more.

Reinforcing Steel Awards

2850 tons, parcel post building, San Francisco, to Soule Steel Co., San Francisco.

2100 tons, housing project, New Orleans, to Concrete Steel Co., Birmingham, Ala.

800 tons, Valley View housing project, Cleveland, to Patterson-Leitch Co., Cleveland; through Sam W. Emerson Co., Cleveland.

800 tons, warehouse, Hill Bros. Inc., Edgewater, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Austin Co., Cleveland.

800 tons, coffee warehouse and mixing plant, Hills Bros. Coffee Inc., Edgewater, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Austin Co., contractor.

785 tons, treasury department, Los Angeles, invitation A-913, list 304, to Judson Steel Corp., San Francisco.

500 tons, viaduct over Rock Island tracks, Burr Oak avenue, Blue Island, Ill., to Joseph T. Ryerson & Son Inc., Chicago; through Thomas McQueen Co., general contractor, Forest Park, Ill.

500 tons, carbon electrode plant, Great Lakes Carbon Corp., Niagara Falls, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Walter Johnson Construction Co., contractor.

375 tons, Commodore Perry housing project, Buffalo, to Bethlehem Steel Co., Bethlehem, Pa.; John W. Cowper Co., contractor.

370 tons, King river bridge, Tulare county, California, to Soule Steel Co., San Francisco.

370 tons, circumferential highway, New York, to Truscon Steel Co., Youngstown, O.; through Tuckahoe Construction Co., Tuckahoe, N. Y.

215 tons, tie plates, Alaska Railroad, to Bethlehem Steel Co., Seattle.

for better welds *and faster welding*

● Jobs like the reinforcing of bridge members, as pictured above, are done in record time with Page Hi-Tensile "F". The welds are strong and ductile. They resist the effects of heavy vibration.

● Page Hi-Tensile "F" is an all-purpose electrode with a reputation for reducing fabrication costs. It is perfectly suited to construction, maintenance and production work. It saves a lot of time on high-speed, single-pass welding and on jobs in Cor-ten, Cro-man-sil, H-T-50 and other new alloy steels.

BUY ACCO QUALITY *in Page Welding Electrodes, Page Chain Link Fence, TRU-LAY Preformed Wire Rope, Reading-Pratt & Cady Valves, Campbell Abrasive Cutting Machines, American Chains (Welded and Weldless) and Wright Hoists.*

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200 tons, plant, Lehigh Portland Cement Co., Allentown, Pa.; to Bethlehem Steel Co., Bethlehem, Pa.

161 tons, bureau of reclamation, invitation 8837-A, Engle, N. Mex., to Laclede Steel Co., St. Louis.

134 tons, bureau of reclamation, invitation 48,188-A, Cody, Wyo., to Colorado Fuel & Iron Co., Pueblo, Colo.

100 tons, Southern parkway MSO-39-6, New York, to Truscon Steel Co., Youngstown, O.

100 tons, public project, Lynn, Mass., to Truscon Steel Co., Youngstown, O.

100 tons, bridge over Levisa river, Buchanan county, Virginia, to Virginia Steel Co.; Haley, Chisholm & Morris, contractors.

100 tons, Keystone Steel & Wire Co. plant, Peoria, Ill., to Ceco Steel Products Corp., Cicero, Ill.

Reinforcing Steel Pending

1575 tons, flood wall, Ceredo, W. Va.; army engineers, Huntington, W. Va.

550 tons, housing project, Huntington, W. Va.; Consolidated Engineering Co., low.

500 tons, Western avenue bridge, Chicago; M. J. McDermott Co., Chicago, low.

400 tons, river intake, Owensboro, Ky.

350 tons, gun battalion barracks, Hickam Field, T. H.; bids June 12.

316 tons, paint shop and transformer building, specification 8994, Mare Island, Calif.; general contract to DaLucca & Son Inc., San Francisco, at $168,750.

290 tons, William Howard Taft school, New York.

270 tons (also 157 tons shapes and metal work and 85 tons 6-inch cast iron pipe), Leavenworth hatchery project; Norris Bros., Burlington, Wash., low; materials to be supplied by bureau of reclamation.

260 tons, North Meadows pumping station, Hartford, Conn., for army engineers, Providence, R. I.

250 tons, grade separation and paving, Brooklyn, N. Y.

200 tons, flood control dike, Springfield, Mass.; bids to army engineers, Providence, R. I.

195 tons, James H. Bowen high school addition, Chicago; James McHugh & Son Co., low.

180 tons, pumping station, Grosse Point, Mich.

175 tons, two bridges, Wawarsing, N. Y., Delaware aqueduct, 341; bids June 6 to board of water supply, New York.

170 tons, generator plant, Holland, Mich.

170 tons, section 18, Pennsylvania turnpike, Franklin county, Pennsylvania.

125 tons, underpass and two bridges, Rockaway and Passaic river flood channel, route 6, section 11A, Parsippany-Troy Hills and Montville townships, Morris county, New Jersey; bids June 9, E. Donald Sterner, state highway commissioner, Trenton.

100 tons, miscellaneous highway work, Washington state; bids at Olympia, June 6.

Unstated tonnage, two Montana state spans, St. Regis river and Glacier county; bids in.

Unstated tonnage, state concrete crossings in Klamath and Wheeler counties, Oregon; bids in.

Unstated tonnage, four state crossings, Jefferson county Idaho; R. G. Rowan, Salt Lake City, Utah, low.

Unestimated tonnage, garage, 14 East Monroe street, Chicago.

Unestimated tonnage, addition to Goodman Theater, Art institute, Chicago.

Unestimated tonnage, sanitorium, Danville, Ill.; bids May 30.

Pig Iron

Pig Iron Prices, Page 70

Pittsburgh—Two blast furnaces banked during the coal mining tieup have resumed, while pig iron shipments are slightly heavier. Coke oven operations also have been stepped up. Supplies are being increased to the pre-strike level and demand is fairly heavy.

Cleveland—Third quarter books are expected to be opened this week at unchanged prices. Consumers are not interested in forward buying, though shipments gradually are being completed against contracts placed last fall before the $1 increase. Deliveries this month are expected to show little change from April. Foundry operations continue to tend downward.

Chicago — Shipments generally are on a par with April, but with many foundries closing four days this week for the holiday, the month as a whole likely will be off moderately. One interest, however, estimates its shipments about 33 per cent improved over last month, but this is an isolated case. Foundry operations are generally unchanged. Scattered sales of iron are being made, reportedly at a firm price of $21. Coke shipments have dropped since settlement of the coal strike.

Boston — Buying is light, and foundry melt continues to drag. Prompt shipment is requested on most iron releases. Announcement of unchanged third quarter prices is expected shortly.

New York—Reaffirmation of pig iron prices for third quarter by eastern sellers is anticipated. One Michigan producer of charcoal iron has extended prices at $25, base.

Philadelphia—Foundry operations are sustained except for stove plants. Pig iron buying is for only immediate needs. Prices are not under pressure and are expected to be extended into third quarter.

Buffalo—Shipments have leveled off recently, but May pig iron business is expected to be slightly ahead of April. Foundry operations are barely steady, with most melters averaging three days a week.

Cincinnati—With consumption tapering, pig iron users are interested in covering only immedate needs. Shipments are unimproved, May deliveries lagging behind the April rate.

St. Louis—Shipments are behind the March and April rates, and new buying is quiet. Stove plants are on light schedules, with farm implement makers relatively most active of leading melters. Implement stocks are being increased. Machine tool and engine builders also are busy.

Toronto, Ont.—Despite some indications of improvement in steel markets, merchant pig iron sales continue slow. Melters are buying regularly but in small lots. Business is principally from small consumers, larger users being well stocked. Prices are firm and unchanged.

Scrap

Scrap Prices, Page 72

Pittsburgh—A stronger tone is evident, although recent sales have been within the current price range. In some cases such transactions represent an advance over figures prevailing a short time ago, but additional buying is believed necessary to develop a strong market.

Cleveland—Recent purchases of iron and steel scrap in Cleveland and the Youngstown district by important steelmakers has stiffened the heavier steel grades 50 cents to $1 a ton. These purchases seem to have been made in small lots, but the aggregate has been fair.

Chicago — Another mill purchase of No. 1 heavy melting steel is reported at the prevailing $13 market. Brokers show little interest in selling at this price since dealers generally are asking the same figure. However, the $12.50 to $13 range of quotations is continued, since occasional small tonnages are going at $12.75 and even $12.50 still is reported.

Boston—Steady and unchanged prices for heavy melting steel for export, with boat loading heavy, tend to support the market. If continued, a stronger influence on No. 2 cast and compressed bundles is considered likely, greater portions of both grades being included in the last large export order of the European cartel. Close to 8000 tons is being loaded here, while about 13,000 tons was shipped recently, including 6900 tons for Japan, part of which was loaded at Portland, Me. Brokers are paying $14 and $13, dock, for heavy melting steel

grades. Domestic buying is light.

New York—Domestic scrap buying is light and prices are unchanged. Eastern steelworks and foundries are placing little beyond early needs. However, export activity has improved, with boat loadings heavier.

Philadelphia—Domestic scrap demand is quiet, but the export market remains active. Foreign shipments from here this month are expected to exceed 30,000 tons. Export prices are higher at $13.50 to $13.75 for No. 2 steel and $15 to $15.25 for No. 1. In the domestic market No. 2 remains $12.50 to $13 and No. 1 at $15 to $15.50.

Buffalo—Scrap prices are holding at recently reduced levels, with little new business in sight. Sentiment has been aided by recent steelmaking gains, and mills are taking shipments steadily against old orders.

Detroit—Except for seasonal activity in cast grades which foundries are taking in fair amounts, scrap continues in the doldrums.

Cincinnati — Scrap activity is largely in buying against old contracts. Quotations are unchanged but are receiving some support through reluctance of dealers to release material at recently lowered prices.

St. Louis—The market has been enlivened by the recent purchase of round tonnages of heavy melting steel by two leading consumers for delivery the next 30 days. No. 2 steel brought $11.50, or $1 below the previous purchase. Receipts generally continue very light.

Birmingham, Ala. — The scrap market continues dull, with little prospect of an early upturn. Movement is in small lots.

Seattle—Prices remain firm despite lack of export buying. Stocks are depleted and receipts below normal. The export market is unchanged at $14 to $14.50 while local mills are buying at $11 and $12 for No. 2 and No. 1 respectively.

Toronto, Ont.—Prices on all scrap grades have been reduced 50 cents to $1 by both Toronto and Montreal dealers. Weakness is attributed to quieter demand and lower bids by consumers. Hamilton mills are said to have cut their offers for steel scrap more than $1. Scrap is flowing into dealers' yards more rapidly, mostly from rural districts.

Tin Plate

Tin Plate Prices, Page 68

Tin plate production is steady at 70 per cent. In the Chicago district the rate is closer to 75 per cent. Specifications continue active, with orders still showing some improvement. However, peak of the season's demand is not far off. Sanitary cans are taking the larger part of current shipments. General line can needs are about steady.

Warehouse

Warehouse Prices, Page 71

Pittsburgh—Announced price reductions largely recognize cutting that had prevailed for some time. Hot-rolled carbon bars are down $5 a ton, with strip, sheets, plates and shapes off $3. Cold-finished carbon bars are off $1. Alloy bars have been reduced $2 for cold-drawn and $3 to $4 for hot-rolled.

Cleveland — Nearly all leading warehouse products have been reduced. Hot-rolled carbon bars are off 25 cents per 100 pounds and cold-drawn 5 cents; plates, structural shapes and hot and cold-rolled sheets and strip 15 cents. Hot-rolled alloy bars are down 15 to 40 cents, with cold-drawn alloy 10 cents lower. Galvanized sheets are unchanged.

Boston—Prices have been reduced $1 to $2.50 a ton. Cold-finished in all shapes is down $1 and reductions of $2.50 have been made on bands, hoops, blue annealed sheets, one pass cold-rolled sheets, uniform blue sheets and cold-rolled strip. Bars, bar shapes, tees, zees, half rounds, half ovals, ovals and bevels and round edge tire steel are down $2. Orders have improved slightly, May volume with most New England warehouses being slightly above April.

Chicago—Business moderated slightly last week, although May is expected to compare favorably with April. The usual seasonal letdown is counted on to appear within the next 30 to 60 days.

New York—Revision of warehouse prices to conform with recent mill changes has been practically completed, reductions ranging from $1 per ton on cold-finished bars to $2.50 for cold strip, hot strip and hot-rolled sheets. Hot-rolled bars and angles are down $2 a ton. Most alloys in these shapes are off 15 to 20 cents per 100 pounds.

Philadelphia—Warehouses are attempting to maintain current prices on sheets and hot-rolled bars instead of following revisions made in other districts. One exception is a $1 reduction in cold-drawn bars. Business continues moderately ahead of April.

Buffalo—Prices have been cut $1 to $5 a ton, the largest reduction

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being on hot-rolled bars. Sheets, strip, plates and shapes are down $3 and cold-drawn bars $1. Galvanized sheets are unchanged. Business is a trifle heavier.

Detroit—Warehouses have announced new prices on a number of items, but quotations on many products still are unsettled and subject to revision at any moment.

Cincinnati—Prices have been revised as a consequence of mill changes. More business is developing from resumption of coal mining. Building items continue slow.

St. Louis—Price reductions by local warehouse include $1 a ton on cold-finished bars, $2 on hot-rolled bars and $3 on certain grades of sheets and strip.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound.

April	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
May											
20	10.00	10.00	9.62½	48.80	48.25	4.75	4.60	4.50	20.00	11.75	35.00
22	10.00	10.00	9.62½	48.80	48.30	4.75	4.60	4.50	20.00	11.75	35.00
23	10.00	10.00	9.62½	48.70	48.25	4.75	4.60	4.50	20.00	11.75	35.00
24	10.00	10.00	9.62½	48.85	48.45	4.75	4.60	4.50	20.00	11.75	35.00
25	10.00	10.00	9.62½	48.80	48.50	4.75	4.60	4.50	20.00	12.00	35.00
26	10.00	10.00	9.62½	49.00	48.62½	4.75	4.60	4.50	20.00	12.00	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 10.00c Conn. copper

Sheets

Yellow brass (high) 16.48
Copper, hot rolled 18.12
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 19.23
Seamless copper 18.62

Rods

High yellow brass 11.85
Copper, hot rolled 14.62

Anodes

Copper, untrimmed 15.37

Wire

Yellow brass (high) 16.73

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 5.75-6.00
Cleveland 6.50-6.75
Chicago 5.87½-6.12½
St. Louis 6.00-6.25

Heavy Copper and Wire

New York, No. 1 ..... 7.75-7.87½
Cleveland, No. 1 ..... 7.50-7.75
Chicago, No. 1 ..... 7.25-7.50
St. Louis 7.50-7.75

Composition Brass Borings

New York 5.00-5.25

Light Copper

New York 6.25-6.50
Cleveland 5.75-6.00
Chicago 5.87½-6.12½
St. Louis 6.00-6.25

Light Brass

Cleveland 3.50-3.75
Chicago 3.75-4.00
St. Louis 3.50-3.75

Lead

New York 4.10-4.35
Cleveland 3.50-3.75
Chicago 3.50-3.75
St. Louis 3.50-3.75

Zinc

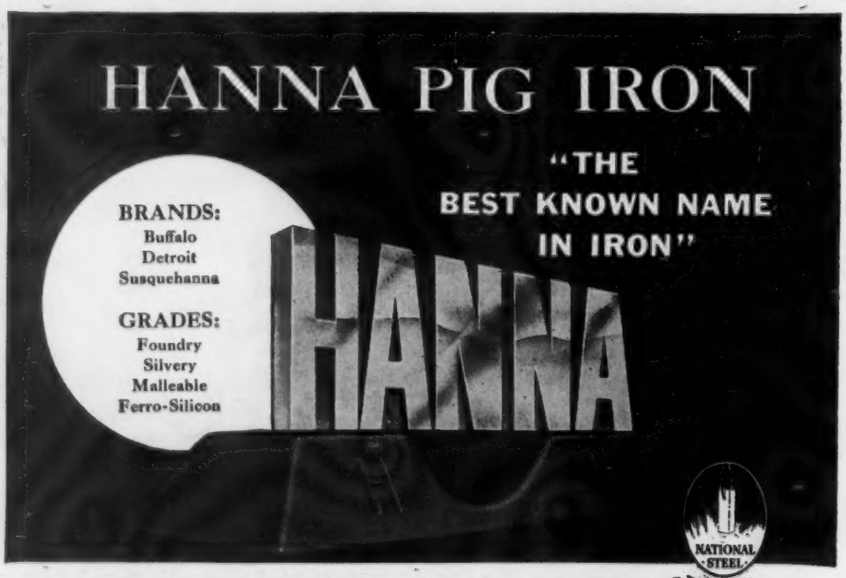
New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.00-2.25

Aluminum

Borings, Cleveland 5.75-6.00
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 14.75-15.00
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .. 10.25
standard No. 12 aluminum 12.00-12.25



THE HANNA FURNACE CORPORATION
MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION
Buffalo Detroit New York Philadelphia Boston

Steel in Europe

Foreign Steel Prices, Page 71

London — (*By Radio*) — Basic steelmaking and pig iron production are reaching record figures in Great Britain. An additional blast furnace stack has been restarted. Demand for foundry iron is still limited, although improving slightly. Buying of hematite pig iron is restricted to immediate requirements, owing to a lower price in effect after July 1. Steelworks and rolling mills are operating at or near capacity. Export business is quiet.

The Continent reports export trade is satisfactory but slightly reduced. Export prices on bars and structurals are somewhat weaker.

French pig iron production in April was 603,000 tons, against 615,000 tons in March; steel production in April 627,000 tons against 660,000 tons in March. Lower April figures resulted from shorter month and Easter holidays. Daily rate continues a steady rise since June.

Iron Ore

Iron Ore Prices, Page 72

Cleveland—Consumption of Lake Superior iron ore during April totaled 2,799,769 gross tons, down from the 3,316,691 tons consumed in March. However, April consumption represented a gain of 51 per cent over the 1,853,658 tons used in the comparable month last year.

Stocks at furnaces and Lake Erie docks May 1 were about 10,885,400 tons smaller than a year ago. Figures of the Lake Superior Iron Ore association follow:

	Furnaces	Lake Erie docks	Total
May 1, 1939..	18,305,966	4,484,967	22,790,933
Month ago ..	21,054,249	4,817,875	25,872,124
Year ago....	28,280,824	5,395,509	33,676,333

Of the 303 American Great Lakes ore vessels, 170 were in commission May 25, according to a study by the M. A. Hanna Co., Cleveland. This represents 57.3 per cent of the total tonnage of these boats. Tonnage in commission June 6, 1938 was only 38.7 per cent, consisting of 123 out of a total of 303 boats.

Nonferrous Metals

New York—Sentiment in metal markets improved markedly last week due to the general price advance abroad, a lessening in European political tension, and upturn in Wall street security values.

Copper—Refiners advanced bids for copper and brass scrap ⅛-cent on Friday as export copper rose to

10.12½c and resale to 10.00c. The producers' market held at 10.00c, Connecticut, on sales averaging about 1250 tons per day.

Lead—Business was spotty with some sellers booking a fair volume of business on one or two days. Consumers are not expected to show increased interest until July books are opened. Prices held at 4.60c, East St. Louis.

Zinc—Undertone of the market firmed due to the rise in London prices above the £14 level. The market was quiet outwardly but fair business was likely done on the rising foreign market. Prime western held at 4.50c, East St. Louis.

Tin—Offerings of metal for June delivery tightened and prices advanced to the basis of 49.00c for Straits spot. Buyers were cautious toward the end of the week in view of the closing of the London market after first call Friday to first call Tuesday for Whitsuntide holiday and the closing of the domestic market Tuesday for Memorial day.

Antimony — American spot advanced to 12.00c, New York, following a similar advance abroad. Chinese spot held nominally unchanged at 14.00c, duty paid New York.

Equipment

New York—Encouraging domestic orders for machine tools will hold May volume well up to April. Such business comes from private industry in addition to a steady flow traceable to armament. Private buying is well scattered and while there have been no large individual purchases, orders for one or two tools at a time are well maintained. Specialty high production tools, largely for replacement, and requiring engineering work, leads. New models of lathes and planers are moving well, deliveries on the former ranging from 14 to 24 weeks with some builders, while planer shipments are even further extended. Numerous shops have substantial backlogs and some are operating overtime.

Chicago — Machinery sales are slow, some interests indicating a slight decrease in bookings recently, although so far this month business is practically on a par with April. At present, hesitancy in buying is reported prevalent, with actual demand rather spotty. No encouragement is seen for the immediate future, as inquiries have slowed down and summer dullness is in sight.

Seattle—Dealers report active demand for spray equipment, flood and irrigation pumps. Private plants are making only necessary replacements. Seasonal requirements for cannery and fishing industries have been placed. Washington state has awarded orders for $10,000 of retorts, tanks, cooking utensils for four state canneries. Low bidder at $38,477 for a highway lighting system, Multnomah county, Oreg., is Berkemeier & Saramel, Portland, Oreg. Bonneville authority has issued a call for bids May 31 for copper cable, June 1 for survey instruments and miscellaneous items, and June 9 for 7400 feet of chain link fence, gates, etc.

Construction and Enterprise

Ohio

BRYAN, O.—Village, C. F. Hester, clerk, will probably take bids in near future on a new 3000-horsepower diesel engine costing with accessories an estimated $150,000, for installation in its power plant. Board of public affairs has charge.

BUCYRUS, O.—Swan Rubber Co. has plans in progress for two new factory units estimated to cost with equipment more than $50,000.

CLEVELAND—City, division of light and power, George Oxer, commissioner, will probably soon advertise for bids, due about June 15, on general contract for constructing an addition to its generating plant, costing $1,000,000. Consulting engineer, Peter Loftus, Pittsburgh.

DOYLESTOWN, O.—Village, B. E. Seaver, mayor, has approved issue of $23,000 mortgage bonds to finance construction of a sewage treatment works. WPA funds allotted.

HAMILTON, O.—Butler county commissioners, P. G. Banker, clerk, is taking bids due at 10 a. m., June 2, on two centrifugal booster pumping units, complete with hydropneumatic storage tank, control equipment, air compressor, sump ejector, pipe, valves and fittings. Fred Hammerle, county engineer.

TOLEDO, O.—Toledo Scale Co. has awarded contract for a new plant to A. Bentley & Son, 201 Belmont avenue, Toledo. Work is now under way.

New York

BEACON, N. Y.—Texas Co., New York, plans to build a new research building at its laboratories here. Will cost over $40,000. D. W. Carswell, engineer, care of owner.

CORTLAND, N. Y.—City takes bids to June 1 on a sewage pumping station and treatment plant costing $230,000. G. D. Holmes, Syracuse, N. Y., consulting engineer.

Michigan

PONTIAC, MICH.—State, Grover Dillman, Lansing, Mich., budget director, is taking bids due at 2 p.m., June 2, on two steam turbine generators, power piping, electrical work, and water treating equipment in connection with additions to power plant at state hospital. Derrick & Gamber Inc., Detroit, consultant.

Illinois

CHICAGO HEIGHTS, ILL. — American Manganese Steel Co. asks bids on a foundry to cost $50,000. B. F. Olson, Chicago, architect.

EAST MOLINE, ILL.—Deere & Co., Moline, Ill., farm equipment builders, soon will take bids for constructing two forge shops, 80 x 260 feet and 100 x 120 feet.

GRANITE CITY, ILL.—Union Starch &

DO YOUR CUSTOMERS BUY FROM HAND-TO-MOUTH THESE DAYS?

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Refining Co. soon will accept bids on a new machine shop, boiler system, engine and generator, costing total of $75,000.

MOLINE, ILL.—Deere & Co. soon receive bids on a five-story, 94 x 150-foot building at its plow works. To house machine shop, tool room, service and maintenance departments.

SIDNEY, ILL.—City has approved $24,000 bond issue and will proceed with plans for a waterworks system costing approximately $53,000.

STREATOR, ILL.—City has completed plans for a sewage disposal plant at cost of about $439,000. C. DeLeuw & Co., Chicago, consultants.

Indiana

CLOVERDALE, IND.—City, R. M. Hunter, clerk, proposes to build a sewage treatment plant and sewerage system at cost of $65,000. C. Hurd, Indianapolis, engineer.

RENSSELAER, IND.—City, board of public works, J. Merritt, clerk, asks bids until June 5 on a new power plant costing $70,000. Will require three sump pumps, eight centrifugal pumps and miscellaneous electrical equipment. J. W. Moore & Son, Indianapolis, consulting engineers.

Delaware

GREENWOOD, DEL.—Delaware Rural Electric association, A. G. Ingram, director, has been allotted $159,000 loan by REA and proposes to build 169 miles of rural power lines.

Maryland

BALTIMORE—City, board of awards, receives bids May 31 for constructing electric substation and other work at Back River sewage treatment plant. Involves conduit, high-tension transformers, switches and cables. George Finck, city sewerage engineer.

District of Columbia

WASHINGTON — Navy department, yards and docks, takes bids to June 14 for a jib crane to be installed at Mare Island, Calif., navy yard. Specification 8975.

WASHINGTON—Navy department, bureau of supplies and accounts, takes bids until 10 a.m., June 2, on a bench-type motor-driven lathe (schedule 6325); a motor-driven turret machine (schedule 6341); a heavy-duty engine lathe (schedule 6342); and motor-driven turret lathes (schedule 6352); until June 6, two single-drum winches with spare parts (schedule 6337); June 9, motor generator set and controller (schedule 6349); and multi-spindle, vertical, drilling and tapping machine (schedule 6408); June 13, motor-driven miller bench (schedule 6391).

Kentucky

MIDDLESBORO, KY.—City receives bids June 1 for contract 1-B, sewage collecting system costing $225,000; and contract 2, sewage treatment plant costing $125,000. J. S. Watkins, Lexington, Ky., consulting engineer.

NORTH MIDDLETOWN, KY.—City will receive bids in June on a waterworks and distribution system costing $50,000. H. de B. Forbes, Richmond, Ky., consulting engineer.

Georgia

TIFTON, GA.—City has rejected preliminary bids on a sewage disposal plant and will call for new bids. Wiedeman & Singleton, Atlanta, Ga., consultants. (Noted April 24.)

Mississippi

VAIDEN, MISS.—Town, D. D. Fullilove Jr., clerk, receives bids June 6 for constructing iron removal and water softening plant at its waterworks.

Louisiana

PLAQUEMINE, LA.—City, Irwin Wilbert, mayor, receives bids June 5 for two sewage and trash pumps and equipment. L. J. Voorhies, Baton Rouge, La., consulting engineer.

Missouri

ANNAPOLIS, MO.—Black River Electric co-operative, Ray Brown, project superintendent, is taking bids to 10:30 a. m., June 1, on approximately 145 miles of rural power lines. E. T. Archer & Co., Kansas City, Mo., consulting engineers. (Noted May 22.)

SEDALIA, MO.—Central Missouri Electric co-operative, W. F. Schiberl, manager, is taking preliminary survey in project for 212 miles of rural electric power transmission lines costing about $225,000.

Oklahoma

ENID, OKLA.—Champlain Refining Co. has plans for a new cracking plant costing $100,000 at its refinery here.

Wisconsin

CORNELL, WIS. — Chippewa Valley Electric co-operative, R. L. Cleaves, superintendent, has been allotted $151,000 additional REA funds for 170 miles rural electric power transmitting lines. Banister Engineering Co., St. Paul, consulting engineer.

MENOMINEE, WIS. — Dunn County Electric co-operative has $241,000 REA allotment and plans to construct approximately 248 miles of rural electric lines in six counties.

WAUSAU, WIS.—City will open bids June 2 for a sewage disposal plant, garbage plant and pressure gas holder plant, to cost in all about $1,340,000. Jerry Donohue Engineering Co., Sheboygan, Wis., consulting engineer.

Minnesota

NEW ULM, MINN.—City, A. C. Sannwald, clerk, will accept bids about June 1 for an office building, laboratory, pumping room, grit and screen chambers, settling tanks and trickling filters at its sewage disposal plant. Ralph D. Thomas, Minneapolis, engineer.

STEPHEN, MINN.—Village, J. F. Yetter, clerk, has approved a $25,000 bond issue and is proceeding with its plans for a sewage disposal plant and water treatment plant costing in all $100,000. P. C. Bettenburg Inc., St. Paul, consulting engineer. (Noted Feb. 20.)

WINDOM, MINN.—City, Martin Peterson, clerk, is taking bids to 7:30 p. m., June 5, on a water filtration plant. Certified check 5 per cent to accompany bid.

Texas

ARLINGTON, TEX.—R. C. Can Co. is drawing up plans for a can manufacturing plant estimated to cost about $50,000 with equipment.

TEMPLE, TEX.—City, Martin Sullivan, mayor, votes June 2 on bond issue of $850,000 to finance proposed municipal power plant and whiteway.

Kansas

ST. JOHN, KANS.—Ninnescah Rural Electric co-operative, Edward Slade, president, has received $153,000 REA allotment and will construct 125 miles rural electric power lines through four counties. A. W. Hefling, Hutchinson, Kans., consulting engineer.

Nebraska

COLUMBUS, NEBR.—Loup River Public Power district, Harold Kramer, secretary, is receiving bids to 10 a. m., June 1, on a power station. Harza Engineering Co., Chicago, engineer.

Iowa

BANCROFT, IOWA — Village, A. A. Droessler, mayor, is taking individual bids to 10 a. m., June 20, on power plant, involving two diesel engine generating units, complete distribution system and various auxiliary equipment. Certified check 5 per cent to accompany bid. A. S. Harrington, Omaha, Nebr., consulting engineer.

BREDA, IOWA—Village, A. R. Bohnenkamp, clerk, is considering proposal to construct a sewage disposal plant. Plans not yet drawn up.

CEDAR FALLS, IOWA — Universal Hoist & Mfg. Co., John R. Voorhees, president, builder of hoists and other equipment, has awarded contract to W. W. Coombs, Cedar Falls, for two one-story additions to its factory, 40 x 50 feet, and 16 x 50 feet.

MUSCATINE, IOWA—City, water and light trustees, R. E. Reuling, chairman, takes bids until 7:30 p. m., June 16, on a 300,000-gallon water reservoir, estimated to cost $37,177.

Colorado

BRIGHTON, COLO.—Union Rural Electric association has received a $320,000 REA allotment for construction of 346 miles of rural transmission lines in five counties.

DELTA, COLO.—REA has allotted a $179,000 loan to the Delta-Montrose Rural Power Lines association for projected 160 miles rural electric lines in two counties.

FT. MORGAN, COLO.—REA has allotted $325,000 to the Morgan County Rural Electric co-operative to finance 193 miles of rural electric power lines in three counties.

Pacific Coast

LOS ANGELES—Hollister Spring Mfg. Co. is making plans to construct a 34 x 122-foot addition to its factory here. Equipment will be needed.

SEATTLE—Bethlehem Steel Co. has had plans prepared for a projected addition to its roll shop building here. Will install equipment.

Canada

VANCOUVER, B. C.—Canadian Liquid Air Co., J. W. Gold, manager, plans to construct a factory for making liquid oxygen. Cost estimated at $40,000.

GARSON, ONT.—International Nickel Co., Copper Cliff, Ont., D. McCaskill, general manager, is building at cost of $2,500,000 a new heating plant, sorting plant, steel head frame, mine hoisting equipment, shops and steel shaft.

MONTREAL, QUE.—Aluminum Co. of Canada Ltd. has awarded contract to Anglin-Norcross Ltd., 892 Sherbrooke street, Montreal, for a plant costing more than $1,000,000.

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Warehouse, not Jobber

To the Editor:

From time to time a considerable number of our members have advocated the use of the terms "steel warehouse," "distributor," or "warehouse" in lieu of the word "jobber" when speaking of those engaged in the distribution of steel through warehouses.

Of course, the point is that the steel warehouses are not jobbers as such, since they sell directly to consumers and not to retailers as does the organization or enterprise between the manufacturer and the retailer. I suppose, too, that the middleman throughout all the ages has been subject to so much criticism for taking a seemingly unearned profit that the word "jobber" has become distasteful to many.

I realize we are asking you to overcome a long established custom, but nevertheless I know many of our member companies will be grateful for your help and co-operation in eliminating from market reports and news stories the word "jobber" as applied to the distribution of steel.

WALTER S. DOXSEY

Executive Secretary,
American Steel Warehouse Association, Cleveland.

Remembers the Stockholder

To the Editor:

Among the forgotten men, and women, to use a phrase much in evidence recently as a political catchword, the industrial stockholder has been coming to the front during the past few months. Prudent people who have saved sufficient dollars to invest in manufacturing company stocks, thus furnishing opportunity for employment to thousands, have seen the wages of their money shrinking year by year.

T. M. Girdler touched on one phase of this situation in addressing the American Iron and Steel institute. (STEEL, May 29, p. 18) the sale of steel at or below production cost. With heavy tax burdens and higher wage rates the load on the industry is sufficiently high to give management a problem in making a profit to give an honest return to stockholoders, without throwing away possible gains in indefensible price-cutting, such as was seen last fall and again a few weeks ago.

Mr. Girdler's remarks were marked by moderation and restraint and pointed out clearly the obligation that rests on sales organizations to sell at a profit, to pay fair wages for the money invested in the business. Labor is well looked after and receives a larger portion of earnings than ever before but the stockholder seems to have been forgotten, though his claim to wages on his investment is as real as that of the worker.

It is heartening to hear the clear-cut opinion of a leader in the steel industry that policies should be shaped to afford a profit instead of throwing away good money in price cutting. Stockholders too often are inarticulate and unorganized, leaving policies entirely to officers, on whom they have little influence. Sentiment is growing among this class to assert their rights and management will do well to heed the signs of revolt against the present situation. Far-sighted executives, like Mr. Girdler, have sensed the unfairness of the situation and are doing all they can to rectify it.

HENRY C. TAYLOR

New York

Spreading Machine Facts

To the Editor:

That machinery does not cause unemployment should be made clear by the figures being quoted by those who know, before various gatherings. In your May 29 issue of STEEL I note two outstanding instances of this effort to catch up with the popular misapprehension on this point.

Edward R. Stettinius Jr. on page 25 and Bennett Chapple on page 27, one addressing the temporary national economic committee and the other the National Association of Purchasing Agents, adduced actual figures from their experience to show the opposite is true, that in the last analysis more men are employed as use of machinery grows.

I think it is too bad that thinking men outside the ranks of industry cannot be made to know the truth of this situation. So much ballyhoo has been spread by politicians with an ax to grind that the man in the street and many men in offices really believe men have been displaced by machines. When someone devises a method for spreading the truth in a way to catch up with the error it will go far toward clearing up a lot of loose thinking by people who take their opinions readymade.

Mr. Stettinius called attention to one feature not so well known, that today's steel product requires a much greater degree of processing than in past years, especially in flat-rolled steel.

It might be added that fabrication of these forms of steel require much more employment than was needed by cruder steels of former years, thus again adding to the number of men gainfully employed.

WILLIAM MORGAN

Chicago

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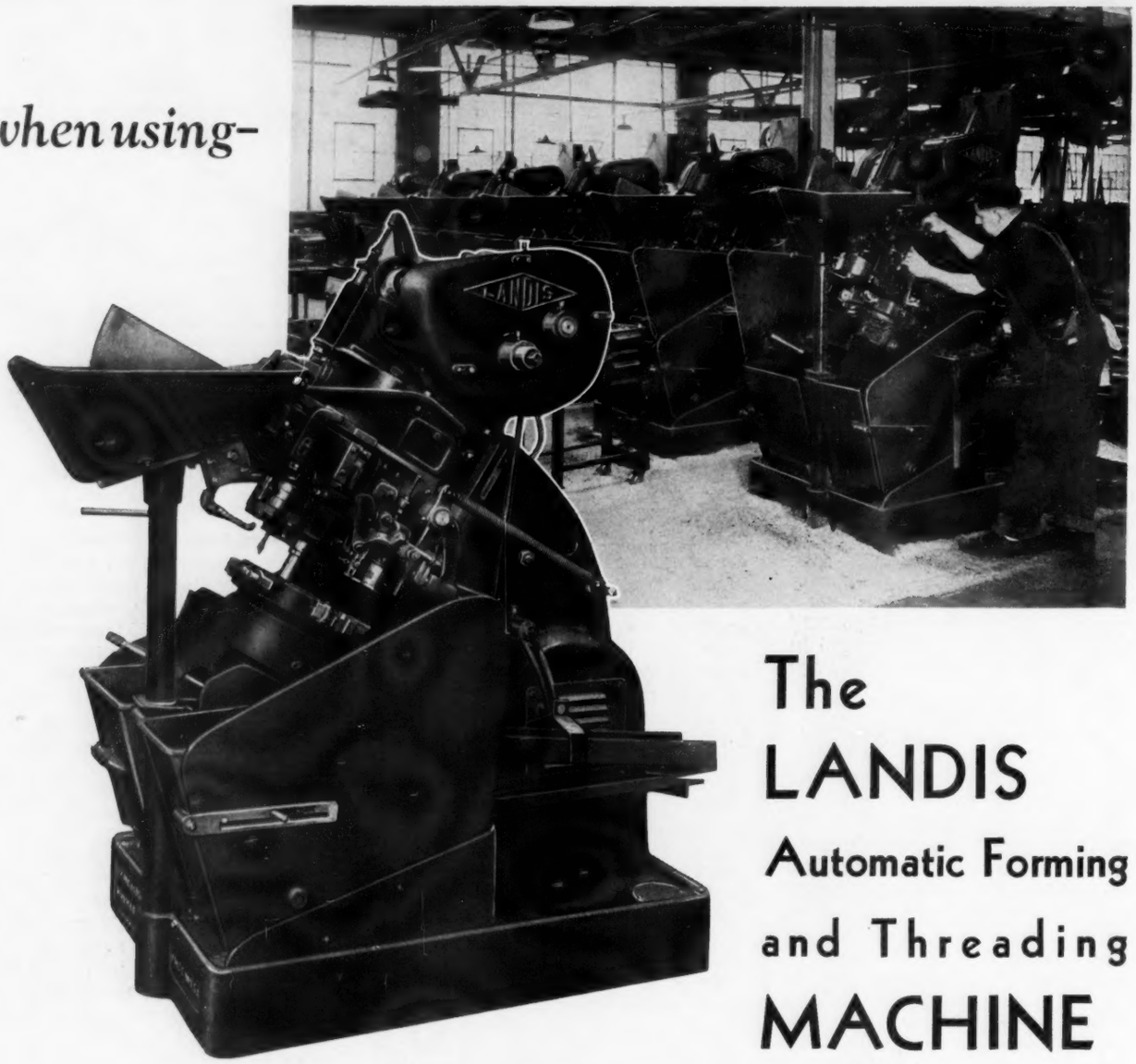

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